THE AMERICAN
JOURNAL OF PHARMACY.

SEPTEMBER, 1879.

PILL COATING.

By Robert H. Dimock.

Pills without coat are, when freshly made, undoubtedly most active, but if kept for any length of time, grow hard and more or less insoluble. Mr. H. M. Wilder's recommendation to keep them in mass and make them as required (as in the case of blue mass, and directed by the British Pharmacopœia), is a good suggestion, but some inconveniences are connected with it which interfere with its general adoption. Inclosing or coating the mass, when freshly made, in the form in which the pills are to be taken, and thus preventing drying and hardening, is an improvement; and when we not only preserve the pills from deterioration through atmospheric influences, but also improve the appearance and conceal the taste, it would seem as though we had reached perfection. Still, there remains an opportunity for experiment to fill a want felt at the prescription counter; we need a coating which can be applied to the fresh pill as soon as formed, and which will dry sufficiently in a few minutes to permit the pills being placed in a box. I hope to supply that need, in this paper, and think the process will enable any pharmacist to coat all the pills he dispenses with a permanent, soluble coating.

Sugar, as a coating, is very beautiful in appearance, and pills so coated are fairly active, when well made; but the use of sugar coated pills compels the druggist to depend upon the wholesale manufacturer, as with no means or machines can he coat, on a small scale, pills with sugar to compare in appearance with those in the market. The necessity for drying the pills, to prevent the discoloration of the sugar and allow perfect adherence of coating, and the time required to bake on the coating, removes sugar, when used alone, from those materials which may be employed at the prescription counter with economy of time.

It seems hardly necessary to speak of resinous coatings, as apart from the insolubility of the resin the same dry, hard pill is needed as in the case of sugar. Dipping in gum, or sugar solution, and then rolling in either powdered starch, slippery elm, French chalk, etc., fails to produce a coating which I would take much pride in; the pill dries slowly, and when dispensed in an excess of powder without drying, complaints are raised that the coating adheres to the fingers or to the patient's mouth, and that the pill tastes very bad. When thoroughly dry, I find these coatings very insoluble, more so than at first I would have thought possible.

A mass for coating, composed of flaxseed, Irish moss and sugar (as recommended in the "Druggists' Circular") was tried, but was found to harden slowly and to mould easily, but to be very soluble. Gelatin has given me the best satisfaction, and more closely approaches, I think, what we want in a quick yet efficient coating, as pills can be coated while soft, the coating hardens quickly, is elegant in appearance and does not require much skill in applying. Among the disadvantages in its use should be mentioned insolubility of coating, if the gelatin has not been carefully selected; moulding, if the coating is too thick; stickiness of coating, from carelessness about concentration of solution; the time required and the trouble in handling the pills on needles; inability to keep the mass ready for use, owing to decomposition, and the injury caused by successive heatings.

In regard to quality of gelatin, I find from such authorities as are within my reach, that Messrs. Cox, of Gorgie, near Edinburgh, make, through their patented processes, as pure a gelatin as is in the British market, with perhaps the exception of Mr. Mackay's, which is only made in small quantities, and that the French gelatins are fine in appearance but generally of inferior quality, and said to be largely manufactured from the immense numbers of rats caught in the sewers and abbattoirs (or public slaughter houses) of Paris, etc.—(Chambers' Encyclopædia). French gelatin is, to a certain extent, made from bones, by removing earthy salts with diluted hydrochloric acid and gelatin with hot water—(Appleton's Cyclopædia). Bone gelatin is inferior in digestibility, etc.—(Tomlinson's Cyclopædia). Ure's Dict. Arts, Manuf'rs, etc., page 626, speaks of Nelson's gelatin as good, but of Cox's as the best. From these authorities, and from

practical experience, I think Cox's gelatin to be better adapted for our purpose than any other in the market.

Moulding of the gelatin, both in solution and on the pill, will be, to a certain extent, remedied by the addition of 10 grains salicylic acid in solution with 8 grains borax to 1 ounce gelatin and ½ ounce water. If the water-bath is made properly shallow, time will be saved in melting; but the injury caused by heating the mass many times can only be obviated, I think, by using the solution described below. The time occupied in the hardening of the coat sufficiently for placing the pills in a box is not under fifteen minutes in the most favorable dry and cool weather, while in mine it will average ten minutes.

Of the different kinds of coatings having gelatins for their base, Garod's consists of gelatin, 5 oz.; gum arabic, 3 oz.; sugar, 2 oz.; water, q. s.; it does not harden as quickly as gelatin alone, and has not as bright and fine an appearance, but is very soluble. It has probably been suggested by the composition used for capsules.

The coating most satisfactory to me, perhaps because originating with me, is made as follows:

Take of Gelatin (Cox's),	℥vi
Acid acetic, No. 8,	f ℥i ℥vi
Spirit of nitrous ether,	f ℥i
Granulated gum arabic,	℥i
Oil of gaultheria,	♏v

Dissolve the gelatin and gum in the acetic acid with the aid of a water-bath, then add the other ingredients, and mix. If the coating solution is to be used with needles alone, substitute for the gum two drachms more of gelatin. Keep securely corked in a wide mouth bottle. Make the pill mass a very little softer than ordinarily; use as little powder as possible in rolling out; when the mass is nearly brought to the proper length for cutting, lay a thread long enough to reach over the sides of the machine before the pill mass, then roll to the proper length and form pills by the machine. With some masses it may be necessary to cut with a sharp knife a slit in the top of the roll, then lay the thread in the slit and close by rolling. If the mass is of proper consistency and the machine handled right, every pill will be nicely formed and all connected together *by the thread.* Then take hold of each end of the string of pills, shake off powder if there is any adhering, dip in the coating solution and twirl as though it was a toy buzz-wheel, which will throw off excess of coating; then hang up by placing pins through

each end of the thread and then into wood, and expose to as cool a draught of air as possible. When hard enough to place in the box, cut the thread close to each pill with a pair of scissors or sharp knife, thus leaving no hole in the coating; the little piece of thread in each pill in length equal to the diameter of the pill should do no harm.

Pills can be coated in this way, I think, in less time than by any other method. They compare favorably in appearance, solubility, etc., with pills coated with any other substance, or with the same substance in any other and longer way. With sufficient practice, every pill can be caught on the thread and neatly rolled without touching it with the fingers; twenty-four pills, or more, according to the size of the machine, can thus be coated as easily as one by the needle, as ordinarily used, and as a matter of course they dry quicker, as in coating with the needle the last pill coated will not be hard when the first is ready for the box. Even if at first only half the number of pills adhere on the thread, they may be coated as easily as one, and the remainder can be coated on the needles until the manipulator improves.

Some of the advantages of this coating are that it is always ready for use—and thus injury caused by repeated heating is prevented—it does not mould or decompose, it drys or hardens quickly, can be applied to pills as soon as made, and when applied is more soluble than gelatin alone.

I would say, in conclusion, that I have been able by practice to make the thread work successfully on my machine, but there is, perhaps, enough of trouble in learning how, to make it doubtful that this method will be of general use; still it is an idea which is freely given for what it may be worth. The coating may not be entirely new to others, but it is to me, and, as far as has been possible, I have reviewed the pharmaceutical literature on this subject. It may be capable of improvement; and for such purpose, and for a trial of what I believe to be its advantages over other coatings, it is now placed before the profession.

New Haven, Conn., July 29th, 1879.

SYRUP OF IPECACUANHA.

Editor American Journal of Pharmacy:

In the "Journal" for July, p. 349, Mr. E. G. Bissell gives a formula for the preparation of this syrup, which is no doubt a great

improvement on the present officinal process, though requiring a little more skill in manipulation. In the "Journal" for August, page 385, Mr. A. Robbins gives another process, which I think is an improvement on that of Mr. Bissell's, although requiring a great deal of evaporation.[1]

If the "Journal" has not yet had an emetic dose of this syrup, I would call the attention of your readers to the formula given by Mr. J. B. Moore, in the "Druggists' Circular" for July, 1877, and originally published in the "American Journal of Pharmacy," March, 1870, p. 127. This process is so simple and easy that we should be glad to see it adopted in the United States Pharmacopœia for 1880. A specimen of the syrup, which I made in accordance with Mr. Moore's formula in September, 1877, remains free from deposits or cloudiness.

PHIL. HOGLAN, PH.G.

Newcomerstown, O., August 12th, 1879.

UNGUENTUM HYDRARGYRI NITRATIS.

BY ALBERT A. G. STARCK, PH.G.

From an Inaugural Essay.

From the results of a number of experiments made under varying conditions with lard, lard oil, neatsfoot oil, olive oil, sweet almond oil and castor oil, the writer has come to the following conclusions:

1. That lard oil is better adapted for the preparation of citrine ointment than lard or neatsfoot oil, because it forms, with the quantity of nitric acid required for that purpose, a preparation more stable and unctuous in its character. Lard, when acted on by HNO_3, becomes hard and brittle, and neatsfoot oil changes into a granular unsightly mass.

2. That the regulation of the temperature is of the greatest importance, inasmuch as the color of the preparation depends greatly upon it.

3. That the oxidation of the fat, as proposed by Mr. Rother in 1870, previous to the addition of the mercurial solution, is an important step, and should be done with care and constant stirring, in order to keep the acid well suspended in the mixture, which, on account of the greater density of the acid, has a tendency to separate.

[1] This is an error. Mr. Robbins' formula for *syrup* of ipecacuanha requires filtering, but *no* evaporation. The syrup is made from the fluid extract, in the preparation of which evaporation is resorted to.—EDITOR.

A sample of citrine ointment, prepared by the writer with lard oil in place of lard, and kept excluded from contact of air at a temperature ranging between 40° and 60° F., did not show any sign of change after more than six weeks.

It is somewhat softer than simple cerate, and easily worked when rubbed upon a slab.

The writer feels assured that if the following formula and precautions for making citrine ointment be generally adopted that good results must follow, and citrine ointment can henceforth be classed among the "Elegant Pharmaceutical Preparations."

℞ Mercury, ... ℥iss
Nitric acid (sp. gr. 1·420), ... ℥iiiss
Best lard oil, ... ℥xviss

Heat the lard oil in a porcelain vessel to adout 200° F., and add nitric acid 1½ troyounce, a little at a time, with constant stirring by means of a glass rod, until combined before more acid is added. Regulate the heat so as to keep up a mild boiling. Finally, set aside to cool slowly. In the meantime, put the mercury into a chemical flask, add the remainder of the nitric acid, and dissolve by aid of heat in the open air. When the oxidized oil commences to congeal add the mercurial solution to it, and stir until it is cold. Put the finished product in 1 or 2 oz. pots, and keep in a cool place, and excluded from light and air.

UNGUENTUM HYDRARGYRI NITRATIS.

By William B. Humrich, Ph.G.

From an Inaugural Essay.

From his experiments, the writer concluded that *elaidin* would be the proper base for the ointment of nitrate of mercury, and proceeded to make that compound from both expressed oil of almond and olive oil, as follows:

In each case the oil was heated over a water-bath to the temperature of 200° F., and nitric acid added, several drachms at a time, until ten drachms of acid had been used to each fluidounce of oil. During the process considerable effervescence occurred and copious red fumes were evolved. The heat was continued for a short time after effervescence ceased, in order to evaporate the water.

The elaidin prepared from almond oil was of a deep yellow color,

quite soft, very sticky without feeling greasy, and rather disagreeable to the touch, while that prepared from olive oil was of an opaque, light yellow color, quite smooth and soft to the touch, not at all sticky, and I think superior to that produced from almond oil.

Taking this elaidin prepared from olive oil as a base for the ointment, the following formula was followed:

℞	Mercury,	45 parts by weight.
	Nitric acid (sp. gr. 1·42),	105
	Elaidin,	495

This produced a very pretty yellow ointment, and one which I have no doubt would keep well, but which, even at the ordinary temperature, is exceedingly soft, almost liquid. In order to overcome this difficulty, I substituted, for part of the elaidin, stearic acid, as follows:

℞	Mercury,	45 parts by weight.
	Nitric acid (sp. gr. 1·42),	105
	Elaidin,	247½
	Stearic acid,	247½

This I found to produce a beautiful pale yellow ointment, about the consistence of simple cerate, not liable to change color or to decompose. The greatest objection, however, is that the ointment has a slightly granular appearance, and does not soften very readily at the temperature of the body. Freshly-rendered beef suet, a substance which is scarcely acted upon by the air, was therefore used in place of the stearic acid, as follows:

℞	Mercury,	45 parts by weight.
	Nitric acid (sp. gr. 1·42),	105
	Elaidin,	247½
	Beef suet,	247½

This produces a beautiful deep yellow ointment, scarcely of the consistence of simple cerate, but still firm enough for dispensing. It retains its color and freedom from rancidity perfectly, and I feel sure it is a preparation which can be relied upon.

OIL OF GAULTHERIA.

By Joseph Brakeley, Ph.G.

From an Inaugural Essay.

The manufacturers of this oil are generally men of limited means and knowledge, and the apparatus used is very crude and simple in its arrangement, being easily taken down and removed to other parts when the

supply of leaves is exhausted. This generally occurs in two or three years.

The first point in locating, after finding where the plant grows plentifully, is to secure a stream of water with enough fall to allow it to be carried to the top of the refrigerating tub. Under a rough shed the apparatus is erected, consisting generally of an ordinary copper whiskey still with a capacity of from two to four hundred gallons, enclosed in brick work, and with the head only projecting. The still is connected with a copper worm, and a cask or tub to receive the distillate completes the arrangement. The process followed is the one generally used in distilling volatile oils. The leaves are placed in the still, covered with water, and heated by an open fire beneath. The steam carrying the volatile oil passes through the worm, is condensed, and the product is collected in the receiving vessel. The oil settling to the bottom, most of the water is dipped out and used again with the next lot of leaves, while the oil is collected by means of a tin separating funnel. The advantage of using the same water in each succeeding operation seems to be understood and is in general practice.

The above method is the one nearly always followed, and the amount of volatile oil obtained varies from ·66 per cent. to ·80 per cent. This is the percentage as given to me by a number of manufacturers. From their statements I believe the average yield to be about seven-tenths of one per cent. From certain facts given to me by one manufacturer, I believe that were a close wooden cask or vessel substituted for the metallic still, and live steam introduced and passed through the leaves, a larger product would be obtained. This process was the only exception to that usually followed. He made his still of heavy tin plate in place of copper; this would be of the usual size and shape, and one would last five or six months. He always noticed that when the still was new and first used the amount of oil produced was very large, and gradually and steadily grew less as the still became older. Finally he would hardly get ·5 per cent. of oil, and would be obliged to throw the still aside. On examining it then he would find it very much corroded and eaten away inside where the steam and oil came most in contact with the metal. He also noticed that a brown spongy mass would collect in the bottom of the receiving vessel, and that the amount of this deposit seemed to be inversely in proportion to the yield of oil. That is, when the still was new it would be almost

wanting, and would gradually increase with the age of the still. This decrease in yield could hardly be ascribed to the plant giving a greater quantity of oil at one season of the year than at another, as the stills were renewed at different times in the year, and always with the same result. The most probable conclusion is that the oil acts on the metal at the temperature used in distilling, and forms the deposit referred to as collecting in the oil. I could not ascertain if other manufacturers using copper stills had noticed the same corroding effect, but as the average yield with all seemed to be about the same, should think it very probable. This same party used also a false bottom in his still, supporting the leaves over a small quantity of water, merely the steam passing through the leaves. He found this arrangement to give better results. There was an arrangement by which the overflowing water from the receiving tub was returned directly and continuously to the still, thus retaining the water there at a constant level.

The oil as thus obtained has the specific gravity 1·17, and is of a pale red to a deep brown color, and by most manufacturers is thus sent into the market, packed in tin cans of various shapes and sizes. One party uses animal charcoal, obtaining a product entirely colorless. He tried redistilling the oil with water and a small quantity of fixed oil, but did not get a satisfactory result; then he tried filtering through animal charcoal and was still unsatisfied. Then he adopted the plan of macerating the charcoal with the oil for several days and then filtering off the oil, which is thus well decolorized. The filter and charcoal are returned to the still with the next lot of leaves, thus losing no oil.

The leaves are gathered principally by women and children. The price paid varies with the locality and abundance of the plants, seldom going below $1.00 or over $1.75 per one hundred pounds. To gather fifty pounds of leaves is considered a good day's work. The average is less, being nearer twenty-five or thirty pounds. The wages earned are small, but the entire family will turn out in the morning, so that by evening they will have collected a good quantity. The people, though, are apt to be indolent, and the manufacturer often finds himself without the material to operate on, and so earns rather a precarious living. None, so far as I know, have ever grown rich at the business, and the decline in the price of the oil in the market of late years has still further reduced their profit.

STATICE CAROLINIANA.

By EUGENE L. REED, Ph.G.

From an Inaugural Essay.

Marsh rosemary is considered by Nuttall, Torrey and other botanists as a mere variety of Statice limonium, of Europe, while others regard it a distinct species. It is indigenous to the Atlantic coast of the United States, and has a perennial root, sending up annually tufts of leaves, which are obovate or cuneiform, entire, mucronate, smooth and on long foot stalks. They differ from the leaves of S. limonium in being flat on the margin, while the latter are undulated. The flower-stem is round and smooth, from a few inches to a foot or more in length, sending off near its summit numerous subdividing branches, which terminate in spikes, and form altogether a loose panicle. The flowers are small, bluish-purple, erect, upon one side only of the common peduncle, with a mucronate, scaly bract at the base of each, a five-angled, five toothed calyx, and spatulate obtuse petals. The meadows in the vicinity of Atlantic City are made beautiful by the marsh rosemary when in flower. The delicate bluish-purple of its blossoms, which appear in August and September, produce a pleasant relief to the eye from the varying shades of green of the salt grasses. It is the forerunner of the bright yellow and crimson tints of the pickle-weed, which later in the fall gives to the meadows such richness of color. The marsh rosemary, or meadow lavender, is highly prized by those who collect grasses to ornament their homes in winter, and is placed above picture frames and in bouquets as one of their most attractive features. The root collected in October possesses medicinal properties in a higher degree than that collected later in the season. It is large and spindle-shaped, branched, fleshy, compact, rough and of a purplish-brown color. Its length depends upon the nature of the soil, which varies from dark muddy to light sandy in numerous localities over the meadows. If found in sandy soil, the root is short and of a branching character, while that obtained from muddy soil is long, straight and less branching. It is bitter and very astringent to the taste, and in the fresh state is without odor, but a decoction kept in a warm place for several days ferments and has a molasses-like odor.

The fresh root is tough and not easily bruised except after the addition of a little alcohol. The tincture obtained with a mixture of one part of alcohol and two parts of water yielded a precipitate with ace-

tate of lead, the filtrate from which contained sugar, gum and extractive matter. The precipitate was dissolved in alcohol, the solution decomposed by sulphuretted hydrogen, and the filtrate evaporated; it yielded 17⅛ per cent. of residue, consisting chiefly of tannin, which gives a greenish-black color with solution of chloride of iron. Statice is powerfully astringent. In domestic practice it is freely used in some parts of the coast line as a remedy for diarrhœa and dysentery, to restrain morbid discharges from mucous surfaces, as a gargle in sore throat and aphthous condition of the mouth and fauces, and as a styptic in passive hemorrhages. If it were necessary to pay the cost of importation, statice would probably be held in as high estimation by the medical profession as kino and catechu. It can be tinctured and employed for all the purposes for which these popular remedies are given; it may also be given in decoction or infusion. Its abundance and valuable properties should cause it to be brought before the medical profession and to be more generally used.

MELIA AZEDARACH, Lin.

By Joe Jacobs, Ph.G.

Abstract from an Inaugural Essay.

This beautiful tree is highly appreciated in the Southern United States for the beauty of its flowers, the elegance of its foliage and the medicinal uses to which it is applied; as a shade tree its popularity is equal to that of the maple in the North. It appears to be indigenous to Asia, but is planted as an ornamental tree in Southern Europe, whence it was introduced into and naturalized in the United States at an early period, after the settlement of Carolina and Georgia. It is not found farther north than Virginia, as the severity of the climate of the more northern districts destroys it. The common names, *pride of China* and *pride of India*, undoubtedly originated from its rare beauty; *Indian lilac* from the resemblance of its flowers to those of the common syringa, and *bead tree* from the use of the nuts in rosaries, to which, also, the German name Paternosterbaum (*paternostertree*) alludes. In the southern States it is known as *China-berry*, and to the young as *popgun tree*, in allusion to the use of its green fruit.

The tree attains a height of 30 to 40 feet, and from 15 to 20 inches in diameter; it grows rapidly, reaching the height of 12 or 15 feet in

four years. The green fruit is very astringent, but when ripe it is a fleshy-yellow drupe, of a sweet taste, rather larger than a cherry, and containing a five-celled bony nut. The green fruit is used in Texas for making blacking.

The ripe berries were largely used in Georgia during the late war for the purpose of obtaining alcohol, by the usual process of fermentation and distillation; the whisky thus obtained was preferred by many to that produced from corn or rye. By expressing the fleshy part of the fruit, like the olive, a fixed oil is furnished from which a "Poor Man's Soap" is made.

Remarkable qualities are said to reside in the fruit, such as will intoxicate robbins, which are particularly fond of, and feed upon them during their annual migration southward; the seeds are widely dispersed by these birds, and hence trees are found in secluded places. Instances are known of the fruit being destructive to hogs, by what means it is not yet ascertained. A decoction of the berries sprinkled on plants prevents the depredations of the grub-worm. The leaves and berries will preserve dried fruit from insects, and when packed with clothing will prevent the attack of moths.

The dried berries in whisky have been employed against ascarides, tape-worm and verminous maladies. The pulp of the berries stewed in lard has been used with success as an ointment in scald head. The decoction of the leaves has been employed in hysteria, and is astringent and stomachic. A decoction of the green bark, 4 ounces to the pint, is administered as an anthelmintic in doses of 1 or 2 flouidounces, followed by a cathartic. When prepared in March or April, while the sap is ascending, unpleasant effects have been observed, such as stupor, dilation of the pupil, etc., which symptoms, however, pass off without perceptible injury to the system.

For the following experiments the bark of the root was employed, and as the liber is very easily separated, and this portion is the most effective in the Nim Bark (*Melia Azadirachta*, Lin.), this alone was used. The liber is of an extremely bitter taste, devoid of astringency, and its decoction gave no evidence of tannin; the outer portion, on the other hand, is very astringent, and its decoction gave abundant evidence of tannin by gelatin and ferric chloride. I may also mention that the inner bark is the portion used in making the decoction for administering.

After several preliminary experiments made with the view of determining the best course to pursue, one pound of the powdered bark was percolated with diluted alcohol until thoroughly exhausted. Upon distilling off the alcohol the aqueous residue held in suspension a considerable amount of insoluble matter. This residue was divided into two parts, one being filtered (*A*), the other evaporated (*B*).

The aqueous filtrate, *A*, was treated with solution of acetate of lead as long as a precipitate was produced; the precipitate was brought on a filter and washed well with water. The filtrate was treated with subacetate of lead, and this precipitate likewise collected and washed. The filtrate was freed from lead by sulphuretted hydrogen, separated from the sulphide of lead, and the sulphuretted hydrogen expelled by heating.

The sulphide of lead yielded nothing to hot water, but when treated with hot alcohol, a small amount of resinous or extractive matter was obtained. The filtrate from the sulphide of lead was concentrated to a syrupy consistence; alcohol produced a slight precipitate, and on the addition of ether a slight semi-fluid mass separated. Both precipitates occasioned by alcohol and ether, redissolved in water and alcohol, respectively, and evaporated spontaneously, left a dark amorphous residue, which was also obtained from the filtrate after ether and alcohol had been expelled; the ether precipitate proved to be sugar.

The examination of the lead precipitate did not lead to any decided results.

The evaporated portion, *B*, had a peculiar odor and bitter taste; it was treated with hot water, acidulated with hydrochloric acid and filtered from the residue, *C*. The filtrate was treated with magnesia and tested for an alkaloid, but none was found. The residue, *C*, was well washed with water, had a brownish-yellow color and a strongly bitter taste, was not affected by hot or cold water, was slightly soluble in carbon bisulphide, insoluble in petroleum benzin and oil of turpentine, and soluble in alcohol, ether and chloroform, which solutions, on evaporation, refused to crystallize. The alcoholic solution was acid to test paper, but apparently did not combine with alkalies. On dissolivng the substance repeatedly in alcohol, and precipitating it by water, most of the color was removed, the resinous principle remaining as a yellowish-white mass. It was given as an anthelmintic to a child aged four years, in the quantity of 3 grains, followed by a mercurial purgative, and proved to

be at least as effectual as other vermifuges which had been previously given.

The results of his observations and experiments lead the author to the following conclusions:

1. The activity of the bark resides in the liber, and this alone should be employed.

2. The active principle is a yellowish white resin.

3. The drug is one of the best anthelmintics, and a fluid extract, prepared with diluted alcohol, or a tincture, would be a valuable preparation that would seem to deserve a place in the Pharmacopœia.

The DETECTION of MINUTE QUANTITIES of WATER in ALCOHOL.

By Henry G. Debrunner, F.C.S., Professor of Chemisrry, Pittsburg College of Pharmacy.

In the course of a series of experiments on the action of potassic permanganate on cold alcohol, I noticed that strictly absolute alcohol, C_2H_6O, does not dissolve any of the above named salt, the alcohol remaining entirely colorless. The addition of one drop of distilled water to 10 cc. of absolute alcohol instantly produces the partial solution of a small crystal of the permanganate, which is indicated by the coloration of the liquid. The intensity of color in this case was strong enough to be still visible on diluting said 10 cc. with 20 additional cc. of absolute alcohol, thus making the total bulk 30 cc., about one fluidounce, which would indicate a sensibility of this test for water in alcohol equal to 0·05 per cent. It is difficult to find absolute alcohol in the market that will stand this test; if obtained or made by further rectification it will, when used, soon absorb enough moisture from the air to betray it on testing. Ccommercial 95 per cent. alcohol, which, however, actually only contained 93 per cent. of C_2H_6O, became strongly colored and looked distinctly darker than a carefully prepared 95 per cent alcohol, which was tested at the same time. An attempt to base a colorimetric method upon this observation failed as below 90 per cent. C_2H_6O a reaction between the reagent and the alcohol takes place, whereby the solution becomes turbid. It still might be accomplished with a salt soluble in dilute alcohol and water, thus coloring the same, but insoluble in absolute alcohol and chemically

inert toward the same. The test is a very simple one: about 4 cc. of alcohol are placed in a test-tube and a crystal of permanganate, $KMnO_4$, is added, when—in case of the presence of water—the coloration will show at once. For observation the test-glass is held on a white sheet of paper. A chemical reaction—oxidation of the alcohol, probably accompanied by the formation of an ether—ensues, but is much slower in the dark than when exposed to light.

CHEMICAL NOTES.

By Prof. Samuel P. Sadtler.

Inorganic Chemistry.—*Norwegium, a newly-discovered metal.*—Following closely upon the announcement of Scandium comes the claim of a Norwegian chemist to have discovered a new metal, which he wishes from patriotic motives to name *Norwegium*, thus following again the rather questionable example set by the discoverer of gallium.

This metal has been detected and isolated by Dr. Tellef Dahll in a sample of copper-nickel from Kragerö in Skjergaarden. The color of the pure metal is white, with a slight brownish cast. When polished it has a perfectly metallic lustre, but after a time it becomes covered with a thin film of oxide. It can be flattened out in an agate mortar, and in hardness it resembles copper. The melting point is 350°C., and the specific gravity 9·441. Its equivalent appears to be 145·9. Only one oxide, NgO, has been obtained. With sulphuretted hydrogen it gives a brown sulphide, even in strongly acid hydrochloric solutions which redissolves in ammonium sulphide. With a slight addition of potassium ferrocyanide it gives a brown, but with larger proportions, a green precipitate. The sulphuric solution is turned brown on the addition of zinc, and the metal is deposited in a pulverulent state. The solutions of this metal are blue, but become greenish on dilution.—*Chem News*, xl, p. 25.

On Uralium, a new metal of the Platinum Group. By A. Guyard.—As far back as 1869 the author discovered this metal in commercial platinum obtained from Russian ores. Next to silver, it is the whitest metal known. Its malleability is as great as that of the purest platinum, but its ductility is much greater, and it is almost as soft as lead. Its melting point lies near to that of platinum, and it is not volatile. Its specific gravity =20·25, and its molecular volume, like those of osmium,

platinum and palladium, is 6·25. Its atomic weight has been found 187·25. In its chemical properties it is dificult to distinguish from platinum.—*Chem. News*, Aug. 1, 1879, p. 57.

Vapor densities of Inorganic Compounds.—Victor and Carl Meyer have continued their determinations of the vapor densities of inorganic compounds, and have satisfactorily established the formulas in several important disputed cases. Thus, in the two publications recently made by them, we have determinations of the vapor density of stannous chloride, zinc chloride, ferric chloride, antimonous acid, cuprous chloride and cadmium bromide. Stannous chloride might have the formula Sn_2Cl_4, or it might be $SnCl_2$. The authors find as follows:

Calculated Vapor-density.		*Experimental Vapor-density.*	
For Sn_2Cl_4,	13·06	Found at 619°C.,	12·85
For $SnCl_2$,	6·53	Found at 697°C.,	13·08

The formula is, therefore, undoubtedly Sn_2Cl_4.

Zinc chloride gave the following results:

Calculated Vapor-density.		*Experimental Vapor-density.*	
For $ZnCl_2$,	4·70	Found at 890°C.,	4·53
		Found at 907°C.,	4·61

The formula is, therefore, $ZnCl_2$.

Ferric chloride, although generally accepted as Fe_2Cl_6, is sometimes written $FeCl_3$, and it was, therefore, quite important to get reliable determinations of its vapor density. Deville and Troost had determined it in sulphur vapor at 447°C. as 11·42 and 11·37, the theoretical for Fe_2Cl_6 being 11·23. The results obtained by the authors were:

Calculated Vapor-density.		*Experimental Vapor-density.*	
For Fe_2Cl_6	11·23	Found at 447°C.,	11·14
		Found at 619°C.,	11·01

Their result agrees, therefore, with those of Deville and Troost, and fix the formula as Fe_2Cl_6.

Ferrous chloride was next tried, but in each experiment the compound was decomposed by the heat applied. The authors hope, however, to succeed shortly with this most important compound.

Antimonous acid was then taken. The authors had previously found that arsenous acid had the molecular formula As_4O_6 instead of As_2O_3 as generally accepted. It was therefore of interest to see if antimonous acid was similarly constituted, or if it had the simpler formula Sb_2O_3. The results were:

Calculated Vapor-density.		*Experimental Vapor-density.*	
For Sb_2O_3, ...	99·5	Found at 1560°C., . .	19·60
For Sb_4O_6 . . .	19·90	" " . .	19 98

The formula of antimonous acid is, therefore, Sb_4O_6, analogous to arsenous acid, As_4O_6.

Cuprous chloride was also determined. The authors had some time previously made a determination, which gave 7·05, corresponding to the formula Cu_2Cl_2, but now have repeated the determination at a much higher temperature.

Calculated Vapor-density.		*Experimental Vapor-density.*	
For Cu_2Cl_2, . . .	6·84	Found at 1560°C., . .	6·93

The formula seems, therefore, definitely established as Cu_2Cl_2. Cadmium bromide gave the following result:

Calculated Vapor-density.		*Experimental Vapor-density.*	
For $CdBr_2$, . . .	9·40	Found at 923°C., . .	9·22
		Found at 914°C., . . .	9·28

The authors promise shortly to make a determination of the vapor-density of Beryllium chloride, with a view of settling the question as to the atomic weight of Beryllium.—*Ber. der Chem. Ges.*, xii, pp. 1195, 1282.

On the behavior of Chlorine at high temperature.—Victor and Carl Meyer have just made public some remarkable results obtained in the application of their method of determining vapor-densities at high temperatures to chlorine. They first tried oxygen and found that the specific gravity of this gas was constant at all temperatures. Thus, the specific gravity was found:

At 1392°C., . 1·06 and 1·04 At 1567°C., . 1·04 and 1·10
Calculated spacific gravity for O_2 is 1·105.

In applying the test to chlorine, however, the following results were obtained:

Specific gravity at 620°C., 2·42 and 2·46 Specific gravity at 808°C., 2·21 and 2·19
Specific gravity at 1028°C., 1 85 and 1·89 Specific gravity at 1442°C., 1·65 and 1·66
Specific gravity at 1392°C., 1·66 and 1·67 Specific gravity at 1567°C., 1·60 and 1·62
Calculated specific gravity for Cl_2 is 2·45 Two-thirds of this valve is 1·63

It appears, therefore, that while the molecular weight of chlorine remained 71 to a little above 600°, at a temperature of about 1200°C., it becomes 47·3, or two-thirds the first value. These results point unmistakably to the composite character of what we call chlorine, and Prof. Meyer has re-called to our attention the old "murium" theory of

Berzelius, according to which chlorine was an oxygen compound. Prof. Meyer is now vigorously following up this possibility, and the production of oxygen from chlorine at high temperatures he puts among the results that may be obtained. He has also found that iodine vapor behaves in a measure analogous to chlorine, when heated to similar high temperatures. His further results will be eagerly looked for.—*Ber. der Chem. Ges.*, xii, p. 1426.

Organic Chemistry.—Dr. W. A. Tilden has made some interesting observations on *the action of hydrochloric acid upon different terpenes.* As is known, by passing dry hydrochloric acid gas into cooled turpentine oil, a mono-hydrochloride, $C_{10}H_{17}Cl$, is formed, while by diluting turpentine oil with alcohol, ether or glacial acetic acid, and then saturating it with hydrochloric acid, a di-hydrochloride, $C_{10}H_{18}Cl_2$, is formed. This forms crystals melting at 48°C. Tilden finds that the same di-hydrochloride exactly is formed when oil of orange (boiling-point 176°) is submitted to this treatment. The terpenes from juniper oil (boiling-point 156°), lemon (boiling-point 176°), bergamot (boiling-point 176°), and caraway (boiling point 176°), yield this di-hydrochloride, as does also the terpene (boiling-point 174° to 176°), contained in the *ol. pini sylvestris* of pharmacy, and a terpene (boiling-point about 176°) obtained from rosin spirit.

The single exception is the "sylvestrene," discovered by Atterberg in Swedish turpentine, and which Tilden has since recognized in Russian turpentine. The di-hydrochloride yielded by this terpene melts at 72° to 73°.

Thus, with this one exception, terpenes of the two classes, boiling respectively at 156° and 176°, and very diverse in their optical properties, may all, by this process, be converted into one and the same inactive hydrocarbon.—*Chem. News*, xxxix, p. 256.

On the formulas of Quercitrin and Quercetin.—While many investigations have been made upon quercitrin the formulas of it and its decomposition product, quercetin, have not as yet been considered as established definitely. Liebermann and Hamburger have made some careful analyses, and have prepared a number of derivatives which enable them to give formulas with some positiveness. For quercitrin they find a composition $C_{36}H_{38}O_{20}$, and for quercetin $C_{24}H_{16}O_{11}$. The decomposition of the quercitrin by dilute acids would then be according to the following reaction:

$$C_{36}H_{38}O_{20}+3H_2O=2C_6H_{14}O_6+C_{24}H_{16}O_{11}.$$

This reaction requires the production of 60·76 per cent. quercetin and 46·08 per cent. isodulcite. Liebermann and Hamburger found as the means of determinations with quercitrins of five different sources 61·21 per cent. quercetin and 46·37 per cent. of isodulcite. From the quercitrin were prepared and analyzed tetrabromquercitrin and quercitrin-potassium, and from quercetin acetyl-quercetin, bibromquercetin, bibromacetyl-quercetin, quercetin-sodium, tetrabromquercetin, and tetrabrombiacetyl-quercetin, and from isodulcite isodulcite-sodium. —*Ber. der Chem. Ges.*, xii, p. 1178.

On Gardenin from Dekamali gum.—Stenhouse and Groves have continued their study of the Dekamali gum, the resinous exudation from *Gardenia lucida*. By distilling the resin in a current of steam a volatile oil came over, which, after rectification over sodium, yielded a terpene boiling at 160° having the formula $C_{10}H_{16}$. From the dark brown liquid residue was extracted the gardenin. Its formula is $C_{14}H_{12}O_6$. By treating this with nitric acid a paste of bright red needles is obtained, which, after recrystallization, was analyzed. Its composition is $C_{14}H_{10}O_6$, and the authors have called it provisionally gardenic acid, although they consider that it has more the character of a quinone. Of this gardenic acid they formed the acetyl compound $C_{14}H_8O_6(C_2H_3O)_2$, and by treatment with aqueous sulphurous acid a compound $C_{14}H_{14}O_6$, which they term hydrogardenic acid. They propose to continue the study of these compounds.—*Chem. News*, xxxix, p. 283.

On the Alkaloids of the Pomegranate-root.—Tanret announces the discovery of three volatile alkaloids in this bark in addition to the *pelletierina*, discovered by him some time ago. The four alkaloids are separated by adding milk of lime to the powdered bark, extracting with water, shaking up this solution with chloroform, and then adding acid to this chloroform extract. The aqueous solution so obtained is then neutralized with sodium bicarbonate, again extracted with chloroform, and the solution treated with dilute sulphuric acid. The acid solution rotates the polarized ray to the right, and contains the sulphates of a right-rotating liquid alkaloid and of an inactive solid alkaloid respectively. If the above procedure be applied to the original liquid, using caustic soda solution, however, we obtain a left-rotating solution. After evaporation over sulphuric acid the mass is spread out on filter paper, whereby the amorphous inactive sulphate soaks into the paper, leaving

white crystals of the sulphate of a liquid right-rotating alkaloid, the rotatory power of which is $A_D = 30°$. The left-rotating compound is found chiefly in the stem, while the right-rotating predominates in the root. The crystalline alkaloid has the formula $C_9H_{15}N_3O,4H_2O$, and forms prisms, fusing at 46° and boiling at 246°, which are easily soluble in alcohol, water and ether. Its salts are crystalline.—*Ber. der Chem. Ges.*, xii, p. 1212, from *Comptes Rendus*, 88, No. 13.

Dessicator for Carbon-disulphide, Ether, Chloroform and Benzol.—Frequently it is desirable to evaporate considerable amounts of the above-mentioned solvents for the purpose of gaining the substance dissolved in them without the application of heat. The spontaneous evaporation of these liquids in the laboratory is not convenient because of the character of the vapors liberated, and all of the solvent must be lost for future use. Liebermann uses a simple device to avoid this. The solutions to be evaporated are placed in an ordinary dessicator in which, instead of sulphuric acid, pieces of low-fusing paraffin are placed. The different liquids evaporate rapidly over the paraffin, which does not lose its absorptive power even when liquefied. Experiments showed that paraffin absorbed its own weight of

Carbon disulphide, . . .	in 4 to 5 hours
Ether, ...	8 to 9
Chloroform, ...	9 to 11

For benzol the absorption is considerably slower. The paraffin will take up more than three times its weight of CS_2 and more than twice its weight of ether. These solvents can be recovered by simple distillation from the paraffin solution, and are gotten perfectly pure.—*Ber. der Chem. Ges.*, xii, p. 1294.

GLEANINGS FROM THE GERMAN JOURNALS.

By Louis von Cotzhausen, Ph.G.

Volatile Oil of Origanum Hirtum, *Link.*—The plant yields 2·8 per cent. of a reddish-yellow volatile oil, which has an aromatic odor resembling thyme, a neutral reaction, the specific gravity 0·951 at 15°C., rotates the plane of polarized light slightly towards the left, and consists, according to E. Jahns' analysis, of one or more terpenes, of 50 to 60 per cent. of a phenol having the formula $C_{10}H_{14}O$, and identical with carvacrol, of a minute percentage of a volatile acid and of a

second phenol, both of which could not be determined, and probably of small percentage of cymol.—*Archiv d. Pharm.*, July, 1879, p. 1.

Salicylic Acid is prepared by J. Bang by evaporating phenol with sodium-sulphhydrate (instead of sodium-hydrate), then treating with carbonic acid as usually, transforming the separated crude salicylic acid with powdered marble and water into the calcium salt, and purifying. —*Chem. Centralbl.*, July 9, 1879, p. 448.

Salicylic Acid Reaction.—A colorless, aqueous solution of salicylic acid, or of sodium salicylate, immediately turns emerald green on the addition of a little copper sulphate; this is particularly the case with sodium salicylate dissolved in 2,000 parts distilled water. The addition of a little alcohol favors the reaction, but in the presence of free sulphuric, or acetic acid, or of ammonia, the green color is immediately destroyed and the original blue color of the copper solution restored. Carbolic acid, which ordinarily is colored blue by copper sulphate, will not interfere with the reaction between the latter and salicylic acid.—*Pharm. Ztg.*, July 26, 1879.

The Cinchona Alkaloids are determined by Prunier by mixing 20·0 grams moderately fine powdered bark, 10·0 slaked lime and 30·0 water, drying the mixture, powdering and extracting it by percolation with a mixture of chloroform (75·0) and absolute alcohol (25·0). The percolation is finished with water, the liquid evaporated to dryness, the residue dissolved in sufficient 10 per cent. hydrochloric acid, the filtrate precipitated by ammonia, the precipitate collected on a filter, washed with a little 1 per cent. ammonia water, dried and weighed. From the mixed alkaloids thus obtained the author extracts quinia by pure ether, while Oppermann dissolves the mass in tartaric acid solution, and adds sodium di-carbonate, which precipitates all alkaloids except the quinia.—*Pharm. Centralh.*, July 10, 1879, p. 274.

Succus Carnis or Meat Juice, extensively used in St. Petersburg by invalids and infants in the place of raw meat, and said to contain all the constituents of the latter in solution, is prepared, according to J. Martenson, by expressing fresh beef by means of hydraulic presses, and filtering. It is a clear, red liquid, having an acid reaction, a pleasant taste, a specific gravity varying between 1·031 and 1·037, and mixes clear with a little hydrochloric acid, but is coagulated by a larger proportion of the latter, and also when boiled. It is not rendered

turbid by acetic acid and sodium chloride, and was found to contain albumen, gelatin, sugar, creatin, inosinic, lactic and carbonic acids and oxyhæmoglobin. The ashes contained potassium chloride, sodium chloride, and phosphate and sulphates of calcium, magnesium and iron. —*Pharm. Ztschr. f. Russl.*, July 1, 1879, p. 385.

Mannit from Cane-sugar.—An unusually large yield of mannit, amounting to 150 grams from 3 kilos of cane sugar, was obtained by Richter in almost colorless crystals as a by-product when preparing lactic acid in the usual manner.—*Archiv d. Pharm.*, July, 1879, p. 27.

Detection of Bromide in Iodide of Potassium.—A. Jandousch calls attention to the fact that potassium bromide yields no precipitate with mercuric chloride, while potassium iodide precipitates red mercuric iodide, which is redissolved as long as undecomposed potassium iodide is present, but remains undissolved when this is no longer the case. One gram potassium iodide is entirely decomposed by 0·82 mercuric chloride and 8·2 cc. of an aqueous solution, containing in the liter 50 grams of mercuric chloride, are necessary to obtain a permanent precipitate. The iodide should not contain iodate, and before testing it should be dehydrated in case it contains water.

Lepage shakes 12 parts of potassium iodide with 150 parts of 90 per cent. alcohol, and considers the iodide pure if there is no undissolved residue. The Austrian Pharmacopœia's test consists in precipitating potassium iodide with silver nitrate, and digesting the precipitate with ammonia when that from pure potassium iodide is not dissolved.—*Pharm. Post*, July 1, 1879, p. 199.

Manufacture of Soda and Potash from Sulphides.—Ernest Siermann grinds the sulphides together with alumina, and heats the mixture to redness, when alkali aluminate and sulphurous acid form, the latter being conducted into lead chambers. The mass is lixiviated, aluminate decomposed by carbonic acid and the potash or soda extracted by water as potassium or sodium carbonate.—*Chem. Centralbl.*, 1879, p. 480.

Artificial Karlsbad-salt.—Prof. Almèn recommends mixing sodium chloride 20 grams, sodium bicarbonate 42 grams, sodium sulphate 104 grams, and potassium sulphate 3 grams, and dividing the mixture into 7 equal parts, one of which is sufficient for 1 quart of good spring-water. 100·000 grams Karlsbad-water thus prepared contain 521 grams dehydrated salts, which, with the 22 grams of salts which

are at least contained in 100·000 grams of spring-water, amount to 543 grams, the quantity contained in the natural Karlsbad-water.—*Pharm. Ztg.*, July 23, 1879.

Liquor Ferri Persulphatis.—Oltmanns mixes the sulphuric and nitric acids and water, and gradually adds the ferrous sulphate in crystals, applying a moderate heat and finally boiling. The iron dissolves quickly and is immediately oxidized; the reaction is moderate and any excess of nitric acid can be readily removed by adding, in slight excess, solution of ferrous sulphate, previously mixed with a proportionate quantity of sulphuric acid, and again by adding a little nitric acid, which escapes quickly on boiling.

Liquor ferri sesquichloridi is made by the same author by gradually adding solution of ferrous chloride to the mixture of the acids; the latter is not, however, used by the author before it has a brownish-red color, which is readily produced by moderately heating. The mixture must contain sufficient hydrochloric acid to decompose all nitric acid; an excess of hydrochloric acid is not objectionable, because the liquor is finally concentrated, and requires the addition of hydrochloric acid; when necessary, either ferrous chloride or the acid mixture may be added.—*Pharm. Centralh.*, June 26, 1879, p. 250.

Unguentum Potassii Iodidi.—Schoch modifies the formula of the German Pharmacopœia, which directs 1 part sodium hyposulphite to 20 parts potassium iodide, by adding gradually only sufficient hyposulphite to remove the yellow coloration. The addition of as little as $\frac{1}{10}$ per cent. iodine will then become apparent by the color of of the ointment, the iodine remaining in a free state.—*Pharm. Ztg.*, July 12, 1879, p. 425.

The color of infusum ipecacuanhæ depends, in Th. Paulack's opinion, on the kind of water used in preparing it, distilled water yielding a much lighter colored infusion than ordinary water containing iron, nitric or nitrous acid. The depth of the color increases with the percentage of the compounds named.—*Ibid.*

Indelible Ink not Containing Silver Nitrate.—Hager triturates 10 parts anilin black with 200 parts alcohol and 15 parts fuming hydrochloric acid, and adds a solution of 15 to 20 parts gum arabic in 800 to 1,000 parts water. After standing for two weeks this ink can be used with a common pen. In case the ink is to be used for marking metal,

wood or leather, it is diluted with a solution of 15 parts shellac in 800 parts alcohol, instead of the aqueous solution.—*Pharm. Centralh.*, 1879, p. 279.

Cheap logwood copying-ink is made by Fehr by boiling 35 grams extract logwood with 1 kilogram of weak vinegar until dissolved, allowing the mixture to cool, and adding 20 grams ferrous sulphate, 10 grams alum, 16 grams gum arabic, 32 grams sugar, and 2 grams glycerin.—*Ibid.*

WALNUT LEAVES AND THE EXTRACT OF WALNUT LEAVES.

By C. Govaerts.

Preparations of the walnut (*Juglans regia*, L.), after having enjoyed in France the popularity often gained by recently introduced medicines, are not much now employed. Experience has demonstrated, however, that the walnut may be classed among the plants most useful in medicine. The author quotes various authorities who speak highly of its antiscrofulous properties.

The Belgian Codex includes an extract of the dry leaves, and the extract enters into the composition of the "Sirop de Vanier," a preparation largely used. The author's experiments have been directed to ascertaining whether this extract represents the maximum of the active principles contained in the leaves and what are the conditions that may influence the quantity of these principles in the leaves and in the extract.

The leaves of the walnut contain principally chlorophyll, tannin, a volatile aromatic principle and an acrid bitter matter (juglandin) found more specially in the green husk and the epiderm of the seed. Distilled in the fresh state, the leaves yield a rather aromatic limpid water, neutral to litmus paper.

The fresh juice is green, but upon being heated it abandons its chlorophyll and at the same time becomes sensibly darker in color.

In drying, the leaves lose 50 to 55 per cent. of their weight, but without sensibly altering in color or taste. The petioles only turn brown.

These leaves cannot be collected according to the general rule, *i. e.*, at the commencement of the flowering, for at that time they have scarcely issued from the buds and are far from possessing the desired properties.

If walnut leaves collected at the proper time and recently dried be compared with those met with in commerce, the difference in the characters is striking. After some months, in fact, the dried leaves, exposed to the open air, turn brown, and at the same time lose their aromatic odor and bitterness. This physical change, produced under the influence of moisture and air, is the index of a chemical transformation that takes place after the drying. The prolonged action of air and moisture gradually converts the juglandin into an insoluble and insipid black substance, and the tannin becomes partially insoluble or decomposed.

Experiments were made with preparations from (1) leaves collected in June; (2) leaves collected in October; (3) leaves collected at the proper time, but which had been kept one year. Tannin being one of the most active principles of the leaves, this was estimated as indicative, to a certain extent, of the value of the respective preparations. The method adopted was that of Löwenthal, based upon the oxidation of the tannin by permanganate of potash in the presence of indigo carmine. A gram of each extract was dissolved in 100 cc. of distilled water, and 20 cc. of each solution were submitted to the action of the permanganate.

(*a.*) An extract prepared from the juice of leaves collected in June, clarified by heat and evaporated. Taste, bitter and astringent; odor, aromatic; solution, limpid; tannin in 1 gram of extract, 0 19 gr.

(*b.*) Similar leaves were submitted to distillation, and the residue filtered and evaporated to an extract. Taste, slightly bitter; odor, very slight; solution, turbid; tannin in 1 gram, 0·19 gr.

(*c.*) The remainder of the June leaves were dried in the open air and an extract prepared from them according to the Belgian Pharmacpœia. Taste, bitter and astringent; odor, aromatic; solution, limpid; tannin in 1 gram, 0·20 gr.

(*d.*) Leaves collected in October were dried directly and converted into extract. The product resembled (*c*) in every respect.

(*e.*) Extract prepared from leaves one year old. Taste, slightly astringent and slightly bitter; odor, none; solution, very dark; tannin in 1 gram, 0·10 gr.

(*f.*) Extract of commerce. Similiar to (*e*) with the exception of solution being limpid.

It appears, therefore, that the full grown leaves may be collected at

any period during the fine weather, even as late as October, when they can be removed without injuring the tree. The extract of walnut, in order to represent the active principles as completely as possible, should be prepared with such leaves recently dried. The extract prepared from the defecated juice is as rich in tannin, but does not keep so well, whilst that prepared by decoction should be rejected. The leaves falling in autumn should not be used, although there is reason to believe that they are often employed in preparing the extract of commerce.

Walnut leaves of good quality are of a fine green color on their upper surface and of a darker green underneath, with brown petioles. They have a parchment-like texture, an aromatic odor and a freely bitter and astringent taste. Altered leaves lose the greater part of their odor and bitterness, and turn a dirty green color, approaching brown. Fallen autumn leaves sometimes have yellow spots on their surface.—*Pharm. Jour. and Trans.*, July 12, 1879, p. 25, from *Répertoire de Pharmacie*, vol. vii, p. 145.

THE ALKALOID OF MIO-MIO (Baccharis coridifolia).[1]

By Pedro N. Arata.

The Mio-Mio (*Baccharis coridifolia*, Lam.) is a composite plant, abundant in the Banda Oriental del Uruguay, the Argentine Republic and Brazil. The notoriety which this plant has acquired in these countries is due to the toxic action which it exercises upon the animal organism, it being the cause of considerable losses of sheep and cattle to the farmers; and it is the more dreaded because the animals confound it with the healthy pasture among which it grows. The author reports that he has obtained from this plant an alkaloid in sufficient quantity to allow of the following description.

The dry powdered plant was boiled with distilled water in a porcelain capsule and the water separated by decantation, the operation being repeated until the material was completely exhausted. The united liquors were filtered and evaporated, at first over a fire, and afterwards in a water-bath, to the consistence of an extract, which was mixed with double its weight of a mixture of caustic lime and magnesia, and the evaporation was then continued to dryness. The product was pulverized and digested for 48 hours with amylic alcohol in a closed vessel

[1]Abstract of a paper in the "Annales de la Sociedad Cientifica Argentina," vol. iv, p. 34.

with frequent agitation, then thrown on a filter. The filtrate of amylic alcohol, upon evaporation, left the alkaloid in a crystalline form.

Amylic alcohol is preferable to ether in this operation as it dissolves the alkaloid very readily, especially with heat, and a saturated solution deposits a very voluminous crystalline mass. Under the microscope the crystals appear as long, delicate needles, sometimes united, and radiating from a common center so as to form stars.

Water dissolves the alkaloid sparingly; ether and alcohol dissolve it with more facility, but it is not very soluble in them; the best solvent is amylic alcohol.

Dissolved in water the alkaloid gives neither an alkaline nor an acid reaction, it showing no change of color with vegetable reagents. It dissolves with greater facility in boiling water to which some drops of acetic acid have been added. The acetate that results if fairly soluble in boiling water, but upon cooling the liquid becomes turbid as if concentrated, the turbidity disappearing upon the addition of more water.

The solution of the acetate gave the following reactions: With sodium phosphomolybdate or phosphomolybdic acid a greenish-yellow precipitate, disappearing when heated and reappearing on cooling; with potassium iodohydrargyrate, a yellowish-white precipitate; with the double iodide of cadmium and potassium, a light crystalline precipitate; with potassium platinocyanide, a very marked turbidity; with platinum chloride, a light-yellow precipitate, disappearing when heated and reappearing on cooling; with gold chloride or picric acid, a yellowish precipitate; with potassium iodoiodide or sodium phosphoantimoniate, a reddish-yellow precipitate; with phosphotungstic acid or mercury bichloride, a white precipitate; with potassium ferrocyanide, an abundant white precipitate; with potassium ferricyanide, a dark green coloration when heated; with sodium nitroprussiate, a coloration, and with sodium phosphoantimoniate, potassium sulphocyanide or potassium bichromate, no change. The author considers that the foregoing reactions demonstrate that this substance is an alkaloid, and he has named it "Baccarina."

Some physiological experiments made upon a sparrow have proved that baccarina exercises a toxic action, and further investigation in this direction has been undertaken be Professor Pirovano. Senor Arato promises to study the elementary composition of the alkaloid and its salts with a fresh quantity of material.—*Pharm. Journ. and Trans.*, July 5, 1879.

GHEA- OR SHEA-BUTTER.

By C. Deite.

This fat is prepared from the seeds of *Bassia*, a tree growing in India and the western parts of Africa. Various species of the order bassia yield fat, that from which ghea-butter is obtained being called by Kotschy *Butyrospermum Parkii;* by Olivier, *Bassia Parkii.* The fruit from which this fat is extracted is the size of a pigeon's egg. A thin husk surrounds a fleshy substance possessing an agreeable taste. This substance covers a kernel from which the butter is prepared in the following manner. The kernels are dried in the sun, pounded, placed in large earthenware vessels, and boiled with water. The fat which rises to the surface is skimmed off. It as of a grey- or green-white color, and has a peculiar tough, sticky consistency, similar to a mixture of fat and turpentine, and possesses a peculiar aromatic smell. It may be kept for a considerable time without turning rancid, and is therefore used very largely as lard. According to Thomson and Wood, its melting point is 43·3°; Château gives 29°, and the Brussels Stearin Company 23° to 24°. Thomson and Wood have obtained a solid acid from this fat, melting at 61°, which they call margaric acid. According to Oudemanns, this substance is a mixture of a solid fatty acid, melting at 61°, and a liquid acid. The former is stearic acid, and, according to Pelouze and Boudet, the liquid fat is olein. By treating ghea butter with concentrated sulphuric acid and distilling, fatty acids melting at 52—54° are obtained, which, when pressed, give a stearin melting above 60°. In spite of its high melting point, this substance is soft and friable—a circumstance which is due to the fact that it is pure stearic acid and not a mixture of solid fatty acids. It is therefore necessary to mix this fat with palmitin or some other solid fat, otherwise it is difficult to use it in candle-making. On the coast of Coromandel this fat is used for soap-making, the product obtained representing a hard, white mass, which, however, does not form a lather.—*Jour. Chem. Soc.*, July, 1877, from *Dingl. Polyt. Jour.*

ANALYSIS OF CAOUTCHOUC.

By D. Lindo.

In the analyses of different samples of vulcanized caoutchouc, the percentage of ash varied from 62·7 to 32·07, that of zinc oxide from

60·71 to 15·3, and in three samples the percentage of calcium carbonate was 11·1, 30·29 (mean of three analyses) and 30·44 (mean of two).

The action of certain acids on the caoutchouc was attended with (1) the distension of the material; (2) appearance of small elevations on the surface; and (3) crimping of the edges. These effects are due to the absorption of acid by the material, the solvent action on the mineral matter, and in some cases on the caoutchouc, the softening of the material whereby the acid enters the pores more readily, and the small elevations are due to superficial distension.

Sulphuric acid, spec. grav. 1·828, decomposes the material in a few hours; when diluted with an equal volume of water, it dissolves out the zinc oxide pretty freely, except from those samples containing considerable quantities of calcium carbonate; it slightly impairs the elasticity, and does not produce crimping. When diluted with 19 times its volume of water, it dissolves appreciable quantities of zinc oxide.

Hydrochloric acid, sp. gr. 1·154, dissolves out considerable quantities of zinc, in some cases gas being evolved. After some time the caoutchouc assumes a red color, and becomes decidedly crimped, and sulphur separates out. Heated with four times its volume of water it produces slight crimping.

Nitric acid, sp. gr. 1·374, decomposes caoutchouc rapidly; when the acid is diluted with 4 volumes of water, decomposition proceeds more slowly, with slight crimping. When diluted with 9 volumes of water, the acid merely dissolves the metallic oxide, producing crimping.

Acetic Acid.—63 to 64 per cent. anhydrous acid has very little action on pure vulcanized india-rubber, but when it contains mineral matter, this is rapidly dissolved by the strong acid, the mass becoming distended and slightly crimped at the edges. The distension is greater when dilute acid is employed, for although it is produced more rapidly by the stronger acid, yet for this reason it is sooner arrested. The edges soon become crimped, which effect, if the acid is very dilute, is visible only on examination with a lens, by the aid of which it is possible to detect 1 part of anhydrous acid in 3,000 parts of water by the crimping of the edges.

It is possible that formic acid will exert a similar action.—*Jour. Chem. Soc.*, July, 1879, from *Chem. News.*

RESEARCHES ON ALBUMIN.

By Schützenberger.

It having been observed that albuminoid substances when submitted to the action of baryta under suitable conditions appear to be transformed entirely into crystallizable or into definite principles, it seemed reasonable to suppose that a carefully conducted and complete study of this reaction would be likely to materially contribute to a knowledge of the proximate composition of these bodies, if it did not ultimately solve the question respecting their constitution.

With this end in view, the author instituted and has carried out an extended series of experiments upon the action of baryta solution at high temperatures on coagulated egg-albumin and other nitrogenous principles, the results of which investigation form the subject of the present memoir.

The albuminoid under experiment was placed with the alkaline solution in an iron silver-lined autoclave, and heated to a definite temperature for some hours. After cooling, the contents of the cylinder, consisting of an amber-colored liquid and a solid deposit, were transferred to a large flask, and the ammonia (1) distilled off into hydrochloric acid and estimated; the residue (2) in the flask was brought upon a weighed filter, washed with boiling water until the baryta was removed, then dried and weighed. The filtrate from the latter was precipitated by a current of carbonic anhydride, the barium carbonate removed, and the baryta remaining in the liquor exactly precipitated by sulphuric acid and its weight ascertained. The acid thus set free, which proved to be acetic acid (3) with traces of formic acid, was distilled off in a vacuum and again determined. The residue remaining from the distillation of the acetic acid, which the author terms *fixed residue* (4), is of a clear yellow color, friable and easily removable from the vessel; it contains all the fixed principles such as leucine, tyrosine, etc., which are formed at the expense of the organic substance, in the proportions in which they are produced.

Determination of the Ammonia.—Having proved that coagulated albumin, washed with ether and dried at 140°, contained 16·5 per cent. of nitrogen, the effect of boiling it with three times its weight of baryta under ordinary pressure was ascertained. 1·2 per cent. of nitrogen was evolved in the form of ammonia within the first half hour, the disengagement proceeding slowly, until after 120 hours' boiling 2·2 per

cent. had been eliminated; this number was never exceeded. At 120° in the autoclave, 2·2 per cent. of nitrogen was evolved by digestion during six or eight hours; at 150°, with only twice its weight of baryta, 3·1 per cent. was obtained; whilst between 150° and 180°, with three parts of baryta for 24 hours, 3·95 per cent. was disengaged, and the limit of 4·0 per cent. was not exceeded even by heating with six parts of baryta for six or eight days. These three limits indicate clearly three successive and different stages of decomposition.

Insoluble Barium Salts.—The quantity of this deposit like the ammonia varies with the temperature and with the proportion of baryta used; in composition as well as in weight, it undoubtedly bears a direct relation to the quantity of ammoniacal nitrogen disengaged. It consists mainly of barium carbonate and oxalate, with a certain amount of barium phosphate and sulphate; the proportions of the two former, the only important elements in the mixture, were as follows: From 100 grams of albumin—

				N.	$BaCO_3$.	BaC_2O_4.
With	200 grams of	BaH_2O_2	at 100°	2·1	3·6	3·4
"	"	"	at 120°	2·3	4·7	4·3
"	"	"	at 150°	3·1	10·5	5·0
"	300 grams	"	at 180°	4·0	10·8	8·0
"	"	"	at 200°	3·95	11·0	8·6
"	600 grams	"	at 180°	3·79	11·2	18·2
"	"	"	at 250°	4·41	12·5	24·2

Acetic Acid.—The proportion of this acid is always relatively small; it varies with the temperature and the proportion of the baryta, as in the previous instances, the smallest quantity obtained being 2·7 per cent., and the greatest 5·4 per cent.

Fixed Residue.—The total weight of this residue, obtained as above mentioned (including 6·53 per cent. of organic matter carried down by the barium carbonate), amounted in one experiment to 95·83 per cent., and in another to 96·5 per cent. of the albumin used. It is evident, therefore, that the decomposition under the influence of baryta is accompanied by a fixation of the elements of water, inasmuch as the separate weights of the components being added together there is always an excess varying from 10 to 14 per cent. The ultimate analyses of the fixed residue gave very constant numbers, which did not vary greatly even under different formative conditions, the mean numbers being C=48·16; H=8·2; N=11·03; O=30·75 per cent.

Volatile Oil.—There is formed, during the decomposition of albumin in the manner under discussion, a very small quantity of a volatile oil, about 1 or 2 per cent., which could not be obtained in sufficient quantity for analysis under ordinary conditions. An operation on the large scale with 10 kilograms of albumin enabled about 50 or 60 grams of the oil to be collected, and an examination to be made. It had no fixed boiling-point; on account of the small quantity at disposal it was not possible to separate its constituents by fractional distillation. It was therefore divided into four portions boiling from 113° to 120°, 120° to 140°, 140° to 180°, and above 180°, and an analysis of each portion made. From the results of these analyses the author is of opinion that the oil is a mixture of two substances, one the more volatile, containing oxygen but not nitrogen, the other nitrogen but not oxygen. The presence of pyrrol in the oil was clearly established by means of its well-marked reactions. The formula $C_{16}H_{23}NO_3$ calculates very nearly to the percentage obtained, from which if the formula of pyrrol be deducted (C_4H_5N) there remains $3(C_4H_6O)$, which may be considered to represent approximately the composition of the remainder. A small quantity of a sulphuretted body is also contained in the oil. The quantity of this albuminol obtainable is so small that it is impossible to assign to it any important part in the constitution or in the reactions representing the decomposition of albumin.

The proximate analysis of the fixed residue was a work of very great difficulty, and every method that could be devised was tried with only partial success. It was eventually found that the best method was to treat the residue with neutral solvents, and to separate the constituents as far as possible by means of fractional crystallization. The indentification of the various principles was afterwards effected by means of ultimate analysis, which, in the absence of any well characterized reaction, was found to be the only sure or practicable means of arriving at satisfactory results. More than 500 combustions were thus made.

The two terms which were the easiest to isolate from the fixed residue, on account of their slight solubility, were *tyrosin* and *leucin*, the former, which is produced to an extent varying from 2·3 to 3·5 per cent., was recognized by its crystalline form, and by its well-known color reaction with mercurous nitrate; the latter was also obtained in

a well-crystallized condition, and gave results on analysis agreeing accurately with the formula $C_6H_{13}NO_2$.

The successive crystaline deposits, obtained by progressively concentrating the solutions from which the leucin, etc., had been partially separated, were composed of amido-valeric and amido-butyric acids, together with two new, definite, crystallizable products, *tyroleucin* $C_7H_{11}NO_2(C_nH_{2n-3}NO_2)$ and a body corresponding with the formula $C_6H_{11}NO_2(C_nH_{2n-1}NO_2)$; the quantity of tyroleucin obtained was about 60 or 70 grams from 10 kilograms of albumin. Tyroleucin presents itself as a white crystalline deposit of chalky aspect, possessing scarcely any taste, but soluble in about 20 parts of water at 15°. It melts and decomposes at 240°C., breaking up into a white sublimate and a volatile oily base having an odor of raddish; it leaves behind an abundant yellow vitreous residue. The analysis of the chloroplatinate of the base gives it the formula of collidin, $C_8H_{11}N$, and of the vitreous residue the formula $C_{14}H_{18}N_2O_2$; the decomposition of tyroleucin may therefore be taken as proceeding thus:

$$2(C_7H_{11}NO_2)=C_{14}H_{18}N_2O_2+2H_2O$$
$$2(C_7H_{11}NO_2)=CO_2+\underbrace{C_8H_{11}N}_{\text{Collidin.}}+\underbrace{C_5H_{11}NO_2}_{\text{Amido-valeric acid.}}$$

from which one is led to suppose tyroleucin to be a compound of amido-valeric acid with a body of the formula $C_9H_{11}NO_2$, the latter differing from tyrosin only by an atom of oxygen. This is rendered more probable by the fact that tyrosin, when heated under similar conditions, breaks up into CO_2 and a base, $C_8H_{11}NO$, which differs from collidin only by an atom of oxygen.

Among the homologues of leucin, amido-valeric and amido-butyric acids were met with in quantity, but amido-propionic acid in very small proportion only; its presence, however, was clearly and distinctly made out.

To the compounds of the formula $C_nH_{2n+2}NO_2$, the author gives the generic name *leucins*, and to those of the formula $C_nH_{2n-1}NO_2$ the names *leuceins* (n=6); both seem to be frequently produced by the splitting up on crystallization of bodies of the formula $C_mH_{2m}N_2O_4$ (m=10 or 12); however by repeated fractional crystallization the com-

pound $C_{12}H_{24}N_2O_4$ gave always the same analytical numbers, from which it is fair to suppose that it has an independent existence. The supposition is moreover strengthened by the fact that similar results were obtained with the lower homologues containing 11, 10, 9, and even 7 atoms of carbon.

For these latter bodies, the name *glucoproteins* has been adopted, on account of their sweet taste; they crystallize less easily than the leucins, especially the lower terms; they are very soluble in water, but almost insoluble in cold absolute alcohol; hot alcohol of 90 per cent. however dissolves them with ease.

Another substance resulting from the decomposition of albumin, which is produced in important quantity, is a yellow viscous body obtained by precipitating certain mother-liquors from which leucins have been crystallized by ether. Dried at 120°, it is converted into a transparent amorphous mass, which on analysis gives numbers comprised between the formulæ $C_5H_9NO_2$ and $C_4H_7NO_2$, very often sensibly approximating to the formula $C_9H_{16}N_2O_4$; it appears in fact to be constituted in great part of butyric leucin with an admixture of some superior homologue.

The longer the action of baryta on albumin is continued, and the more concentrated the solution, the greater is the proportion of leucins and of leuceins formed, whilst under the contrary conditions the intermediate bodies or glucoproteins constitute the bulk of the fixed residue, representing the initial terms of the hydration of albumin. Under all circumstances, caproic leucin and tyrosin appear to be the ultimate term of the decomposition.

The mechanism of the reaction would therefore appear to admit of the following explanation: The albuminoid molecule losing ammonia and carbon as carbonic, oxalic and acetic acids, and assimilating water, is converted into a comparatively simple mixture of glucoproteins, $C_nH_{2n}N_2O_4$, containing as its principal term $C_9H_{18}N_2O_4$. By the prolonged action of baryta and a high temperature, these glucoproteins split up partly into leucins and leuceins, and partly into double compounds, formed by the union of glucoproteins and leuceins with the leucins.

The leuceins may perhaps be regarded as amido-acids of the acrylic or of an isomeric series. They reduce ammoniacal silver nitrate on

warming, and are attacked by bromine in the cold with formation of HBr and an acid of formula $C_nH_{2n-1}NO_3$. In the analysis of the fixed residue the ratio of nitrogen to oxygen is never rigorously 1:2, but there is always a slight excess of oxygen, so that the ratio is nearer 1:2·1 or 1:2·3; this difference indicating the presence of small quantities of non-nitrogenous compounds or of bodies in which the atomic relation of nitrogen to oxygen is greater than 1:2. A careful examination for such bodies among the crystalline deposits resulted in the detection of a few grams of an acid from 1 kilogram of albumin, offering a composition very close to that of *glutamic acid*, $C_5H_9NO_4$, and a smaller quantity of a second, whose composition was that of glutamic acid minus water, $C_5H_7NO_3$, which has been called *glutimic acid.* Judging from their amount, these acids play but a secondary part in the constitution of the mixture resulting from the decomposition of albumin; the acids, on the other hand, which are capable of being extracted in reasonable quantity from the insoluble barium salts do not exhibit a constant composition; they appear to be residues of a progressive decomposition, and to be susceptible of being resolved by the continued action of baryta into a mixture of leucines and oxalic acid.

Without following all the steps by which the author succeeded in tracing the presence of the various bodies which are met with in small proportions as constituents of the fixed residue, and modify slightly the ratio between the nitrogen and oxygen, we may sum them up as follows: 1. Traces of succinic and lactic acids. 2. Tyrosin. 3. Amido-acids of the type of $C_nH_{2n-1}NO_2$ glutamic and aspartic acids. 4. Amido-acids of the type $C_nH_{2n-3}NO_3$ glutimic acid. 5. Amido-acids of the types $C_mH_{2m-4}N_2O_6$ and $C_nH_{2n-1}NO_3$. 6. Intermediate compounds of the type $C_mH_{2m}N_2O_5$.

The principle, which is the most constant among the products of the decomposition, and whose proportion is the most easy to determine on account of its sparing solubility, is tyrosin. The maximum quantity obtained of this body was 3·5 per cent.; if, therefore, one molecule of albumin reacts in the formation of one molecule of tyrosin, it points to the approximate molecular weight 5,500 for the former, since $\frac{181}{5500}=3{\cdot}3$. An expression of the form $C_{240}H_{387}N_{65}O_{75}S_3$ corresponds with a molecular weight equa to 5,473, which satisfies the

conditions involved in the determination of the sulphur and tyrosin, as well as the results of elementary analysis, thus:

	C.	H.	N.	O.	S.	Mol. weight.
Experiment, .	52·57	7·16	16·6	21·8	1·8	—
Theory, . .	52·62	7·07	16·62	21·64	1·75	5,473

Again, taking as the basis of calculation the experiments made with 5 or 6 parts of baryta at 180°, the centesimal proportions of the product were:

N as NH_3.	$BaCO_3$.	BaC_2O_4.	$H_4C_2O_2$.
4·03	17·6	11·0	4·6

which corresponds very fairly for 5,473 parts of albumin with—

NH_3.	$H_2C_2O_4$.	CO_2.	$H_4C_2O_2$.
16 mols.	4 mols.	3 mols.	4 mols.

From these numbers the following equation may be written, which, moreover, would give a fixed residue of 99·6 per cent.:

$$C_{240}H_{387}N_{65}O_{75}S_3+60H_2O=16NH_3+4C_2H_2O_4+3CO_2+4C_2H_4O_2+C_{221}H_{435}N_{49}O_{105}+S_3.$$

Deducting a molecule of tyrosin from the formula of the fixed residue, we have $C_{212}H_{424}N_{48}O_{102}$, which approximates very closely to an expression of the form $C_nH_{2n}NO_2$, differing from it only by a slight excess of oxygen.

By taking in this manner the series of experiments made with different proportions of baryta and at different temperatures, a number of equations may be written, in all of which the theoretical composition of the fixed residue corresponds very closely with that obtained experimentally.

There can be no doubt that during the hydration of albumin as many molecules of water are assimilated as there are molecules of ammonia liberated. If, then, from the proposed formula for albumin we deduct the ammonia, carbonic, oxalic and acetic acids in the proportion furnished by experiment, less a number of molecules of water equal to the number of molecules of ammonia (adding as many molecules of water as there are molecules of carbonic anhydride produced, since the latter probably results from the decomposition of urea) we shall have

$$[16NH_3+4C_2H_2O_4+3CO_2+4C_2H_4O_2—16H_2O+3H_2O],$$

which leaves $C_{221}H_{311}N_{49}O_{58}$, an expression which corresponds with the type $C_nH_{2n-2}NO$ quite as nearly (?) as that of the fixed residue with the type $C_nH_{2n}NO_2$, the difference on both sides being a slight excess of oxygen. The molecule of albumin, therefore, resembles that of a body whose formula is $x(C_mH_{2m-4}N_2O_4)$, where $m=2n$, and undergoes hydration in two distinct steps. At 100°, with a limited proportion of baryta, the grouping fixes a number of molecules of water equal to one-half the number of atoms of nitrogen which it contains, and becomes $x(C_mH_{2m-2}N_2O_3)$. The latter, at a higher temperature, can in its turn fix a number of molecules of water equal to the number of atoms of nitrogen which it contains, changing itself to the formula $x(C_mH_{2m}N_2O_4$, the final result being the assimilation of as many molecules of water as the albumin contains atoms of nitrogen. *Albumin is then probably an imido-derivative, which by hydration changes into a mixture of amido-derivatives.*

To return to the observed relation between the ammoniacal nitrogen evolved and the carbonic and oxalic acids produced, it is noticeable that two molecules of ammonia are disengaged for each molecule of acid generated. The simplest reaction which could account for such a phenomenon would be to suppose that the ammonia results from the hydration of urea or cyanamide and oxamide, a supposition which acquires a much greater degree of probability when it is shown that a very large majority of nitrogenous principles, when similarly decomposed, yield a quantity of ammonia which is precisely the amount that should be furnished by the carbonic and oxalic acids produced at the same time, supposing the whole to result from the reaction above mentioned. The author has examined wool, hair, ossein, isinglass, gelatin, goat's hair, silk, fibrin and chondrin, in all of which the above relations held good.

Summary.—It has been shown: 1. That the mixture of fixed principles derived from albumin by hydration contains only amido-derivatives. 2. That these derivatives can be divided into two unequal portions, one, the weight of which is about 16 to 18 per cent., containing the substances in which the ratio of nitrogen is 1 : 3, or 1 : 4, or 2 : 5; the most important fraction of this portion consists of acids of the formula $C_nH_{2n-1}NO_4$, $C_nH_{2n-3}NO_3$, $C_{2n}H_{4n-4}N_2O_6$, and $C_nH_{2n-1}NO_3$, the intermediate term being only a molecular combination of the terms $C_nH_{2n-3}NO_3$ and $C_nH_{2n-1}NO_3$. The second portion, which consti-

tutes four-fifths of the residue, may be represented by the formula $x(C_nH_{2n}N_2O_4)$, with a value for n a little less than 9. According as the limit of hydration is attained the products formed belonging to the type $C_mH_{2m}N_2O_4$ (where m is a multiple of n) are progressively resolved into simple bodies belonging to the same apparent type; these again resolved into bodies of the type $C_nH_{2n}N_2O_4$, which in their turn are resolved into leucins, $C_nH_{2n+1}NO_2$, and leuceins, $C_nH_{2n-1}NO_2$. This interpretation is not affected by the presence of more highly oxygenated acids in the fixed residue, since they may be considered as derived from any of these bodies by substitution of O for H_2.

To the memoir is added an appendix, in which are given the results of some analyses made of fixed residues obtained from different sources. Albumin purified by Wurtz's method was substituted for crude albumin; the baryta was precipitated in one instance by carbonic anhydride, in another by carbonic anhydride and sulphuric acid, and in a third by carbonic anhydride, ammonia and ammonium carbonate, but no important differences were observable in the products of decomposition. It was also found to be a matter of indifference whether the hydration of the albumin was begun by the action of other agents less energetic than baryta, such as dilute sulphuric acid; on completing the action by the intervention of baryta as usual, the same result was obtained as in the previous instances. A fixed residue obtained by the action of baryta was subsequently boiled for 24 hours with a 20 per cent. sulphuric acid, but its composition was not found to be sensibly affected.

In a final operation, conducted with the usual reagents, the action of baryta upon albumin was carried to its extreme limit. The fixed residue was carefully examined to see whether any substance was produced under such condition, which had not been found, or had been overlooked in previous experiments; nothing, however, was met with but the usual mixture of leucins and leuceins.

The molecular weight of the various glucoproteins still remains to be determined.—*Ann. Chim. Phys.*, [5], 16, 289–419, from *Jour. Chem. Soc.*, July 1879, p. 542.

VARIETIES.

American Chemicals.—The increased domestic production of crude materials from which chemicals are prepared in this country has done much to contribute towards the balance of trade in favor of the United States, and for the past year this balance has been remarkably large. Until recently the supplies of chemicals were obtained from Europe, but now cream of tartar, tartaric acid, citric acid, borax and many other important chemicals are largely manufactured here, in many cases from native crude materials. The American borax mines in Nevada supply the entire home department for crude and refined borax salt, and large quantities are exported in both conditions, while much of the refining is carried on in this city and vicinity. Not only is the money, amounting to millions of dollars annually, and which formerly went abroad for these supplies, saved to and kept in this country, but large numbers of men are given employment in the manufacture of the articles above named.

Cream of tartar. Six years ago this chemical was almost, if not entirely, imported from France to the extent of over 6,000,000 pounds yearly, but so successful has the manufacture of it in this country been carried on that last year not a single pound is reported as having been imported. Notwithstanding that the crude materials have at present to be imported, the price of the manufactured articles has been reduced from 32 cents per pound, the rate for the French article here, to 23 and 24 cents per pound for the American production. Again, the importation of the half refined article, under the denomination of argols, which for the previous four years had averaged nearly 2,000,000 pounds annually, has been so reduced that the statistics for the last fiscal year only show importations of 397,767 pounds, proving clearly that the American manufacture is driving out the foreign production in all its grades.

Tartaric acid is another chemical which has been so successfully made here that in place of the 350,000 to 500,000 pounds annually imported from France and England, the average importation the four previous years was only 490 pounds, while the importation for the last fiscal year was only 183 pounds. The price has also been reduced to the consumer to such an extent that it can be supplied to the trade here at a cheaper rate than the foreign article can be laid down in bond. The manufacture employs a large number of work-people, and develops a very valuable industry which appears to be constantly increasing in volume, and promises to become one of the branches of American exports in manufactured articles.

Citric acid formerly came from England at the rate of over 250,000 pounds annually; the statistics for the last fiscal year, however, show that only 27,018 pounds were then imported. When England held the monopoly of the American trade, the wholesale price of citric acid was $1.30 per pound in this market; now it is sold here as low as 57 cents per pound. When the acid was first manufactured here the English attempted to flood the market, but a large amount of capital was soon invested in the American production, and, amidst the most trying difficulties, the trade in the American manufacture was secured. At present the lime juice, from which citric acid is made, has to be imported, but it could easily be produced from the fruits growing in Florida, if only sufficient energy was put in the work. Efforts

are now being made to induce the lime and lemon growers of the South to prepare the lime juice, and, if this should prove successful,—there being no reason why it should not—the entire production and manufacture of citric acid will be kept in the country, saving hundreds of thousands of dollars annually, and developing another great industry.

Borax was formerly imported from England and Europe at the rate of from 600,000 to 1,000,000 pounds every year; now it has largely fallen off, owing to the development of the borax mines in Nevada, and only such qualities are imported as may be needed to make up for any temporary deficiency in the American supply. The importation of borax during the last fiscal year at this port was only 3,492 pounds, and the price of the refined article, which is now prepared in this city, is only from 8 to 9 cents per pound, where formerly it was 35 cents. Instead of importing borax, the last statistics show that out of a native product of about 6,000,000 annually, over 2,000,000 pounds are exported to foreign countries, and over 3,000,000 pounds are used in manufactures in this country; England being now among the buyers, where formerly she was the principal seller of both the crude and refined production. —*New York Commercial Advertiser.*

Brown bronzing liquid for copper and brass consists of copper acetate, 5½ parts; ammonium chloride, 7 parts; acetic acid, 1 part; water, 100 parts. The articles, having been previously heated, are coated repeatedly until the desired color is obtained.

Paris bronzing varnish is a simple solution of shellac and a little camphor in alcohol. 1 part shellac dissolved in 8 to 10 parts alcohol, and mixed with ½ part camphor, triturated with a little lavender oil, yields a varnish which greatly resembles the commercial article.—*Pharm. Handelsbl.*, July 2, 1879, p. 27.

Adhesive composition for preparing sticky fly-paper is made by Nessler by melting together 1 pound white rosin and 1 pound rapeseed oil, or any other non-drying oil (American manufacturers preferably use castor oil), and allowing the mixture to cool.

Another good formula suggests to melt together 1 pound white rosin, 350 grams lard and 330 grams oil.

Brumata-glue is a similar mixture, and said to consist of Venice turpentine and a little expressed oil of laurel.—*Pharm. Ztg.*, July 19, 1879, p. 441.

Quebracho bark has lately attracted some attention in Germany, and the "Berliner Klinische Wochenschrift" contains an article on the subject, communicated by Dr. Penzoldt. Quebracho bark is obtained in Brazil, and probably in other South American states, from a tree belonging to the Apocynaceæ, *Aspidosperma quebracho.* The bark was sent to Prof. A. Baeyer for the purpose of separating the alkaloid, in which he succeeded, calling it aspidospermina. A sample of the bark was given to Dr. Penzoldt to experiment and establish its therapeutical properties. In its native

country it is used in cases where quinia is indicated, and is reported to possess antiperiodic and similar qualities as Peruvian bark. However, the experiments made by Dr. Penzoldt on animals did not verify this statement. He found that its use (a watery solution of an alcoholic extract) exerted a decided influence on the respiratory organs, and infers that it might be a valuable remedy in asthma, dysphora, etc. His experiments on man are not sufficiently advanced yet to permanently establish its merit. It appears that large quantities of the wood are exported to Germany and used there for tanning purposes. It possesses similar medical properties, however, in a much milder form. J. A.

Fanqué on Duboisina.—A drop of duboisina solution causes no more irritation of the eye than a drop of water. A ½ per cent. (2½ gr.) solution dropped into the eye causes the pupil to dilate ad maximum in twenty minutes. The dilatation disappears entirely in seven days. The accommodation is abolished in from fifteen to thirty minutes, its paralysis lasting thirty-six to forty-eight hours, and retiring on the third day.—*Centralblatt für Augenheilkunde*, April, 1879, from *Cinc. Lancet and Clinic*, July 12.

The Eucalyptus.—On the line of railroad between Los Angeles and Anaheim about 180 acres have been set out with eucalyptus, containing over 80,000 trees, and more than half of them are now fifteen to twenty feet heigh. The young tree has been produced in California during the past year in greater abundance than ever, and sold by the nurserymen at much lower prices, with a greatly increased demand. Like many other novelties, the cultivation of the eucalyptus has been subject to much fanciful discussion, and its good effects doubtless somewhat exaggerated. But on the evidence we have heretofore published from time to time of the salutary effects which have followed its culture in Algeria, the Pontine and other marshes, there seems to be no question. New Orleans and thereabouts would seem to be a specially inviting region for its introduction.—*Sanitarian*, June, 1879, p. 255.

Analysis of Coffee Leaves.[1] By Otto Hehner, F.C.S.—A sample of roasted coffee leaves, analyzed by W. Stenhouse contained 1·2 per cent. of theina, 2·1 per cent. of total nitrogen, and yielded 38·8 per cent. of extractive matter, the infusion possessing a taste as of tea and coffee combined.

Having recently had a sample of the slightly roasted leaves, as used in Brisbane, Australia, handed to me, I have examined them with the following results:

Moisture,	10·29	
Theina,	0·29	
Soluble nitrogenous matter,	5·10	Soluble.
Soluble mineral salts,	4·95	
Other extractive matter,	19·81	
Insoluble nitrogenous matter,	13·35	
Cellulose,	34·51	
Chlorophyl, and other insoluble non-nitrogenous substances,	7·83	Insoluble
Insoluble mineral salts,	3·87	
	100·00	

[1] Read before the Society of Public Analysts, February 19th, 1879.

Total extractive matter,	30·15
Total ash,	8·82; of which is
Soluble,	3·83
Insoluble,	4·99; including
Sand,	0·42
Total nitrogen, by soda lime process,	3·02 per cent.

The infusion contained much caffe-tannic acid, as well as some tannin and glucose, the latter probably derived from the decomposition of the tannin.

The amount of theina found is remarkably small.

The taste of the infusion, if it can be compared with anything, resembles that of a mixture of tea and tobacco, a taste invariably observed, as I was told by my informant, by habitual consumers of the infusion.

The leaves when burnt or roasted exhale a powerful odor of tobacco, and the vapors, when condensed on a glass plate, smell overpoweringly of tobacco juice. It is needless to add that the leaves were carefully examined with the microscope, and that they contained no particle of tobacco. The microscopic structure of the leaves present nothing very remarkable, but the sheaths of the veins are most regularly undulated. The stomata are small and numerous.

Mr. J. Hughes said that, having lately visited Ceylon, where he saw Mr. Cotton, who had sent a sample to one of the societies here, he was much interested in the analysis. Coffee leaves had frequently been prepared and exhibited with a view, if possible, for future use as a drink; the infusion was something like tea, and under some circumstances might be used as a substitute by persons living in the country. It is rather strong, but very refreshing, especially after a long walk or ride.—*Jour. App. Sci.*, July 1, 1879, p. 102.

Lactic Fermentation.—Richet has studied the effects of oxygen, of boiling and of digestives upon lactic fermentation. He finds that the fermentation in an elongated tube is only from 65 to 70 per cent. as great as in an ordinary flask. Below 44° (111·2° Fahr.) the activity of fermentation increases with the temperature. From 44° to 52° (125·6° Fahr.) there is no change; above 52° the activity diminishes in proportion as the temperature increases. He attributes the resistance of boiled milk to fermentation to the coagulation of an albuminoid substance which contributes to the development of the ferment.—*Jour. Franklin Institute*, June, 1879, from *Comptes Rendus*.

Physical Modifications of Starch.—M. F. Musculus finds that starchy matter may exist both in the colloid and in the crystalloid state. When colloid, it is soluble in water, saccharifiable by diastasic ferments, and in boiling diluted mineral acids, but it easily undergoes modifications which render it insoluble even in boiling water and unaffected by ferments and acids. Iodine gives it a blue color, while it colors the insoluble form red or yellow. In the crystalloid condition it can be obtained under the form of isolated crystals, which are easily dissolved in cold water; these

crystals rapidly unite and then become less soluble. The crystalloid starch then undergoes the same modifications as the colloid; it remains, however, always soluble in water at a temperature of 50 or 60° (122 to 140° Fahr.), and saccharifiable by ferments and acids. In isolated crystals it is not colored by iodine; in thin solutions it takes a red color; in concentrated solution a violet or blue color, according to the degree of concentration. It passes through parchment paper, although with difficulty.—*Jour. Franklin Institute*, June, 1879, from *Comptes Rendus.*

Improvements in Coating Mirrors.—The French Academy has awarded a prize of 2,500 francs to M. Lenoir for improvements which secure to mirrors all the advantages of silvering, together with the qualities of amalgamation under conditions which preserve workmen from exposure to mercurial vapor. The glass, after being silvered by means of tartaric acid and ammoniacal nitrate of silver, is exposed to the action of a weak solution of double cyanide of mercury and potassium; there is thus formed a white and brilliant silver amalgam which adheres strongly to the glass. The operation is facilitated, and all the materials are economized, by sprinkling the glass at the moment when it is covered by the mercurial solution, with a very fine zinc powder, which precipitates the mercury and regulates the amalgamation. Mirrors which are thus prepared are free from the yellowish tint of ordinary silvered glass, and the amalgam is not easily affected by sulphurous emanations. The committee, in their report, also recount M. Lenoir's improvements in galvano-plastic processes, his discovery of an autographic telegraph, which reproduces writings or drawings with printer's ink, his new and ingenious methods for securing the synchronism of the transmitter and the receiver, and the well-merited reputation which he has acquired for his gas motor.—*Jour. Franklin Institute*, June, 1879, from *Comptes Rendus.*

Fish as Brain Food.—Dr. J. W Draper, in a recent publication, effectually disposes of the wide-spread popular fallacy that fish food is peculiarly suited for the nourishment of the nervous system, and an admirable "brain-food." The fact that phosphorus is consumed in the brain and nervous system in sensation and intellectual activity appears to be well established, from which the necessity for its replacement follows as a matter of course. The idea, however, that fish afford the best medium for this purpose appears to be based upon the erroneous inference that the property they possess of becoming phosphorescent is to be ascribed to the abundance of phosphorus which their flesh contains, whereas it is a property possessed by other organized substances in process of decay—notably by willow-wood, which shines even more brilliantly than decaying fish, and is due to the slow oxidation, not of phosphorus but of carbon. Dr. Draper's argument may be summed up in the statement, "The flesh of fish contains no excess of phosphorus, nor does its shining depend on that element."—*Engineering and Mining Journal*, June 7, 1879.

EDITORIAL DEPARTMENT.

American Pharmaceutical Association.—The twenty-seventh meeting promises to be very largely attended, more particularly from the West and South. Mr. Eli Lilly, the Local Secretary, is still negotiating with some of the Western railroads, and may perhaps make some arrangements in addition to those effected by the time we are going to press. Besides the tickets which are issued at reduced rates via Missouri, Kansas & Texas Railroad, upon certificate from L. Myers Connor, Dallas, Texas, the following reductions have been secured, which have been partly reported before:

Full fare one way and return free on certificate of Local Secretary: St. Louis, Vandalia, Terre Haute & Indianapolis Railroad (Vandalia line); Indianapolis & St Louis Railroad; Evansville & Terre Haute Railroad; Louisville & Indianapolis Railroad; South Carolina Railroad (Charleston & Augusta).

Full fare one way and return on certificate of Local Secretary at one-third fare: C. C. C & I. Railroad (Bee Line); Cincinnati, Hamilton & Indianapolis Railroad; Louisville & Great Southern Railroad; Louisville, Cincinnati & Lexington Railroad.

Round trip tickets to be obtained only upon previous application to and order from Local Secretary: Canada Southern Railroad; Grand Trunk Railway of Canada, and Indianapolis, Peru & Chicago Railroad, one and one-third fare.

Pittsburgh, Cincinnati & St. Louis Railroad (Panhandle), and Indianapolis, Bloomington & Western Railroad, 4 cents per mile one way.

Georgia Railroad (Augusta & Atlanta), Central Georgia Railroad (Savannah & Atlanta), Mobile & Montgomery Railroad, Wabash Railroad (Toledo & Indianapolis), and Indianapolis, Cincinnati & LaFayette Railroad, one and one-fifth fare.

The reduction previously promised for the Eastern members has been withdrawn in consequence of the objections raised by other great trunk lines. The members from New England, Northern New York and Canada have reduced fares by the Canada lines and by the Wabash Railroad, or Bee Line *via* Toledo or Cleveland to Indianapolis; and the members from South Carolina and Georgia have the same advantage *via* Augusta, Atlanta and Louisville. The members from the eastern section of the Middle States will have to pay full fare at least as far as Pittsburg; however, by purchasing tickets to Indianapolis, good for four days, a reduction of about 8 per cent. will be secured, equal in amount to the abatement of fare between Pittsburg and Indianapolis, and leaving the return trip to be made by a different route if desired. Several members have signified their intention of returning by way of Oil City, Niagara Falls, Watkins' Glen or Delaware Water Gap; they may obtain excursion tickets, *via* Pittsburg, from various points of the Pennsylvania Railroad. Other members intend extending their trip to Chicago, St. Louis or Cincinnati. All those going by way of Pittsburg are requested to rendezvous there on Saturday (Sept. 6th) evening or Sunday morning, at the Seventh Avenue Hotel, where accommodations have been secured at $2, or with special conveniences at $2.50 per day. The party will leave Pittsburg on Monday morning at 8.30, and reach Indianapolis the same evening at 11 o'clock.

Vital Statistics of the United States.—A few months ago the Census Office of the Department of the Interior, at Washington, issued a little volume containing blank forms intended for a physician's record of deaths. Every physician throughout the United States has been supplied with a copy, or will receive one upon application. The object is to make the vital statistics of the United States as comprehensive and complete as possible, and all physicians are requested to make use of the printed forms for recording all deaths occurring in their practice during the year beginning June 1, 1879, and ending May 31, 1880. The form of record has been approved by the National Board of Health, and the American Medical Association has strongly endorsed the plan for the purpose indicated.

The National Board of Health, which was organized by Act of Congress approved March 3, 1879, has already done good service in the case of the yellow fever epidemic prevailing for some weeks at Memphis, Tenn., and it is to be hoped that its powers will be extended, the better to prevent the introduction and spreading of contagious and infectious diseases in the United States. The president of the Board is James L. Cabell, M.D., of Virginia, and the secretary Thos. J. Turner, M.D., U.S.N. The office of the Board is at 737 Fifteenth street, Washington, D. C.

False Angustura and Pomegranate Root Barks.—We copy the following from the London "Chemist and Druggist," of June 14, p. 252:

FALSE ANGUSTURA AND POMEGRANATE ROOT BARKS.—The "British Medical Journal" gives some particulars of a trial for homicide which has recently taken place at Avallon, in France, in consequence of the poisoning of a patient by mistake. M. R., a *pharmacien* at Avallon, sold to Dr. L., a medical practitioner in the same town, a quantity of false angustura bark instead of pomegranate root. Dr. L., misled by a certain degree of resemblance between the two substances, and believing that he was using pomegranate root, made an infusion of the substance and gave it to a patient, who died in consequence of taking it. An action for homicide by imprudence was brought against the *pharmacien* and the doctor. The tribunal at Avallon and the Court of Appeal at Paris decided that both were guilty. They refused to admit the plea that Dr. L. might have been misled by the similarity of the two substances, alleging that he ought to have noticed that the infusion which he prepared had not the ordinary appearance of infusion of pomegranate bark, and emitted an unusual odor; and that his suspicion ought to have been excited by the symptoms produced in another patient to whom he had given the same medicine a few days previously. The local tribunal fined M. R. 200f, and Dr. L. 25f. The Court of Appeal added to the fine on the *pharmacien* a sentence of imprisonment for 15 days, and increased Dr. L's punishment to a fine of 200f.

If the false angustura spoken of is the bark of Strychnos nux vomica, we believe that this is the first instance of such substitution. It should, however, be stated that the strychnos bark has no resemblance whatever to pomegranate root bark, and that the two can be confounded only through the grossest criminal ignorance.

How Some "Dirty Shillings" are made by the Profession.—This is the caption of an editorial in the Philadelphia "Medical and Surgical Reporter," August 23d, in which certain practices are discussed which are more frequently ignored by the med-

ical journals. Yet they exist, but to what extent it is difficult to say, because they shun the light and are concealed as much as possible. For the same reasons a remedy for these evils is not easily found. The practices are denounced by the codes of ethics of both the medical and parmaceutical societies, and we believe that a member of either would meet with well merited expulsion, if such collusions could be proven. The self-improved laws have, to a certain extent, failed to abate the evils alluded to, and we believe that the most effectual way for their complete discontinuance will be found in the higher moral training of the aspirants to pharmaceutical and medical honors.

We reproduce the article alluded to unabridged:

How Some "Dirty Shillings" are Made by the Profession.—A physician carries on his profession for the benefit of himself and family in the first instance, and it is proper and honorable in him to make as much money out of it as he honestly can. There are, however, certain practices which are pursued, more or less, in different parts of the couutry, which cannot be approved by a sound moralist; and the proof that they are known to be contrary to a safe doctrine is that they are always conducted with an endeavor at secrecy. Several of these we shall proceed to mention.

It is notorious that certain retail drug stores in this and other cities offer practitioners a percentage on prescriptions which are made up at their counters;[1] and it is well known also that not a few practitioners take advantage of such offers. In fact, they go further, and throw all their influence against stores where they will not be paid this percentage. Yes, we have even had reported to us, in this city, compacts made between physicians, and prominent ones, too, holding official positions in the profession, and a particular druggist, by which patients were forced to buy of this druggist only, through the use by the physician of private formulæ, known only to these parties. The charge to the patient was excessive, and the discreditable plunder thus obtained was divided between the two thie— we mean the two gentlemen.

Another plan to fleece patients has been devised by the enterprising managers of establishments devoted to surgical treatment or to the care of special diseases, as cancer, etc. These managers, who always sport the title of M. D., send circulars widely among the profession in rural districts, claiming that their establishments are admirably supplied with everything needful, and are of real benefit to most patients; and having, by these statements and numerous testimonials, allayed doubts as to their standing, they offer a percentage on the payments made by any patient the doctor will send to them. It is in this way that many of these "institutes" manage to pay their rentals and clear a handsome profit; they subborn the regular profession by money unrighteously drawn from confiding sufferers.

How such "arrangements" are regarded by the law is illustrated in a case recently before the court at Manchester, England. It was brought to light that a doctor made it a point to send as many persons as he could to a particular dentist to have their teeth operated on, and that for this service the dentist remunerated him with a percentage on the proceeds derived from these cases. This does not seem like an aggravated case at all, inasmuch as there was no evidence that the patients were charged above the ordinary fee; nevertheless, the judge stigmatized it as "monstrous," and discreditable to professional men.

It does not seem to us that the professional conscience in this country is sufficiently sensitive to the impropriety of making money in this way. It is improper, because it is deceitful and unfair. No physician would dare tell a patient that he was to get such a commission. The patient expects to receive advice of a wholly disin-

[1] While we grant the correctness of this statement, it is equally true that certain physicians demand a certain percentage on all prescriptions, and, as far as they can, will prevent their patients from obtaining medicines at stores where the prescriber is not feed either in money, the free use of liquors, or by other presents.—Editor Amer. Jour. Phar.

terested kind when he asks what drug store to buy his prescription at, or what establishment to patronize. In common trading such commissions are usual, and everybody knows it;[1] but in the professions they are discreditable, and should be unknown.

Physicians have much to say of the impropriety of druggists prescribing for the sick; of their repeating prescriptions without authority; of their putting up and selling proprietary medicines; of their vending adulterated medicines, and various other tricks of the trade, but to our minds the druggists could often make strong points against the greed of the physicians to obtain percentages, the freqnent unnecessary prescribing of compounds, their dispensing and sale of medicines in their offices, and other practices not more praiseworthy. Let us try to remove this beam from our own eye before we become pressingly anxious to extract the mote from the optic of the druggist.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Laboratory Teaching; or Progressive Exercises in Practical Chemistry. By Charles Loudon Bloxam, Professor of Chemistry in King's College, London; in the Department of Artillery Studies, Woolwich, and in the Royal Military Academy, Woolwich. Fourth edition, with 89 illustrations. Philadelphia: Lindsay & Blakiston, 1879. 12mo, pp. 261. Price, $2.

From a teacher of the experience of Mr. Bloxam a useful and practical work on the subject of his specialty may be expected, and the work before us comes up to this expectation. Devoid of theoretical speculations, the book proceeds at once to its object of instructing in the recognition of chemical compounds, beginning with the simple and gradually proceeding to the more difficult ones. Since the book is intended for beginners, a knowledge of chemistry aud an acquaintance with chemical manipulations is not presupposed; but it aims at teaching chemical facts from the reactions observed, and at directing the attention to the various manipulations when they are required in the course of instruction. These descriptions of manipulations are without exception clear and to the point, though brief. The method of instruction differs somewhat from that which we believe is most frequently followed, in this, that tables for the analysis of unknown substances are given, each one being followed by confirmatory tests, and by descriptions of the substances and their compounds to which the table refers. Not only the metals and mineral and common organic acids, but likewise the more important alkaloids, and a number of neutral substances are referred to and methods given for their detection. About 40 pages of the book are devoted to analysis by the blowpipe, a subject which is often too much neglected. The book is well adapted for systematic study, and as such we heartily recommend it.

The Advantages and Accidents of Artificial Anæsthesia. A Manual of Anæsthetic Agents and their Employment in the Treatment of Disease. By Lawrence

[1] We question the correctness of this assertion, for the paying of commissions to brokers is merely a compensation for services performed, while surreptitious receiving of so-called commissions by salaried employees is as dishonorable in common trading as it should be in the professions.—EDITOR AMER. JOUR. PHAR.

Turnbull, M.D., Ph.G., Aural Surgeon to Jefferson Medical Hospital; Physician to the Department of Diseases of the Eye and Ear, Howard Hospital, Philadelphia, etc. Second edition, revised and enlarged, with 27 illustrations. Philadelphia: Lindsay & Blakiston, 1879. 12mo, pp. 322. Price, $1.50.

Although this book is primarily intended for the physician, the pharmacist will find in it a great deal of direct interest to him; more particularly those portions which relate to the history, mode of preparation, properties and purities of the various compounds which have been used for producing anæsthesia, and to the antidotes in cases of poisoning from their use. The first edition was exhausted in the course of a year, and the present one has been enlarged with all the discoveries and new observations which have been made in the meantime.

The Summer and its Diseases. By Jas. C. Wilson, M.D, Physician to the Philadelphia Hospital and to the hospital of the Jefferson Medical College. Philadelphia: Lindsay & Blakiston, 1879. Pp. 160. Price, 50 cents.

This is one of the "American Health Primers," very attractively written and full of sound advice. The diseases incidental to summer are discussed in six chapters on sun-stroke and heat fever, on summer diarrhœa and dysentery, cholera infantum, summer and autumnal fevers, summer colds and hayasthma, and on the skin in summer and its diseases.

The following pamphlets have been received:

Fourth Annual Report of the Alumni Association, with the Exercises of the Thirteenth Annual Commencement of the St. Louis College of Pharmacy. etc. St. Louis, Mo., 1879. 8vo, pp. 29.

Proceedings of the Convention of Druggists held in Utica May 21, 1879. Proceedings of the New York State Pharmaceutical Association. First Annual Meeting, Utica, May 21st and 22d, etc. New York, 1879. 8vo, pp. 88.

This is accompanied by a metric chart from the Metric Bureau at Boston, and by Prof. Oldberg's pamphlet on metric weights and measures for medical and pharmacal purposes.

Proceedings of the Texas State Pharmaceutical Association at the Meeting held in Dallas, May 1st and 2d, 1879. Galveston. 8vo, pp. 1879.

Accompanied by the Constitution and By-Laws of the Association.

Sur le dosage de l'urée. Par M. C. Méhu.

On the estimation of urea.

The author uses for this purpose hypobromite of sodium, as proposed by Knop in 1871, whereby nitrogen is evolved, the full theoretical quantity of which is obtained after the previous addition of glucose to the urine; without this addition there is a deficiency of about 8 per cent. of nitrogen.

Other Symptoms of Nervous Exhaustion (Neurasthenia). By Geo. M. Beard, A.M., M D. Chicago, 1879. 8vo., pp. 16.

Reprint from the "Journal of Nervous and Mental Disease," April.